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FAMINES IN INDIA:

Their Causes and Possible Prevention.

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FAMINES IN INDIA:

THEIR CAUSES AND POSSIBLE PREVENTION.

BEING

THE CAMBRIDGE UNIVERSITY LE BAS PRIZE ESSAY, 1875.

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BY

A. LUKYN WILLIAMS, B.A.,
Scholar of Jesus Coll., and University Crosse Scholar.

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To My Mother.

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AUTHORITIES USED FOR THE FOLLOWING ESSAY.

Reports by Col. Baird Smith on the Famine of 1860–61.

i. dated 8th May, 1861.
ii. dated 25th May, 1861.
iii. dated 14th August, 1861.

"Report of the Commissioners appointed to inquire into the Famine in Bengal and Orissa" in 1866.

"Statement exhibiting the Moral and Material Progress and Condition of India, during the year 1872–73." (Blue Book for India, 1872–73.)

Government Papers on the Scarcity of 1873–74.

Dr. Hunter's "Annals of Rural Bengal."

„ "Orissa."

Sir Bartle Frere's "The Bengal Famine."

"Indian Famines," by Mr. Charles Blair.

Any others that have been used will be found described fully in the notes.

N.B.—In spelling Indian names, the authority of the Blue Book for 1872–73 has been followed, except in quotations.

THE CHIEF FAMINES THAT HAVE OCCURRED IN INDIA.

A.D.	
1345 (about).	(*Vide* Blair, p. 16.)
1661.	Said to be universal.
1770.	In Bengal.
1783.	North-West and the Punjab.
1803.	North-Western Provinces.
1837.	ditto.
1861.	ditto.
1866.	Orissa (chiefly).
1868.	Rajputana (chiefly).
1874.	Bengal.

FAMINES IN INDIA.

INTRODUCTION.

"Still fresh in memory's eye the scene I view,
The shrivelled limbs, sunk eyes, and lifeless hue;
Still hear the mother's shrieks and infant's moans,
Cries of despair and agonizing groans.
In wild confusion dead and dying lie.
Hark to the jackal's yell and vulture's cry,
The dogs' fell howl, as midst the glare of day
They riot unmolested on their prey!
Dire scenes of horror, which no pen can trace,
Nor rolling years from memory's page efface."

LORD TEIGNMOUTH.*

WE in England have no idea what a famine is like. Yet no age or country has been, or can ever call itself, exempt from famine. Palestine in the days of Abraham and Isaac;† Egypt and the neighbouring countries in the time of Joseph;‡ Egypt again in

* "Lines on the Indian Famine of 1770." Quoted in Hunter's "Annals of Rural Bengal," p. 28.

† Gen. xii. 10; xxvi. 1.

‡ Gen. xli. 54.

1064 and 1200 A.D.* India in 942, 1345, 1631, 1770, 1837, and 1866†; Persia but a year or two ago; Asia Minor even now; and, to come nearer home, Ireland about 30 years ago,‡—have in turn been ravaged by famines. We shall feel the importance of the subject more fully if we devote a few words to the consideration of the effects of past famines, especially those in India.

The effect of famines is twofold: direct and indirect. Suffering and misery to individuals they directly cause; indirectly they impoverish the nation, and injure those nations that come in contact with it.

The suffering and misery that they cause can hardly be exaggerated. In the Egyptian famine of 1064–1071 A.D., we read that "the people ate corpses and animals that died of themselves: the cattle perished; a dog was sold for five deenárs, and a cat for three deenárs, . . . and an ardeble (about five bushels) of wheat for 100 deenárs, and then it failed altogether."§ Again in the Egyptian famine

* See Smith's Dict. of Bible, i., p. 611.

† For a list of the chief famines in India, *vide supra.*

‡ 1845–47 A.D.

§ Smith's Dict. of Bible, i., p. 611.

of 1200 A.D, the historian 'Abd-El-Lateef, who was an eye-witness, "states that the people throughout the country were driven to the last extremities, eating offal, and even their own dead; and mentions, as an instance of the dire straits to which they were driven, that persons who were burnt alive for eating human flesh were themselves, thus ready roasted, eaten by others." *

Referring to the Indian famine of 1345, † Mr. Blair quotes the evidence of a foreigner, Ibn Batula, who witnessed the suffering. "Distress was general, and the position of affairs very grave. One day I went out of the city to meet the wazir, and I saw three women who were cutting in pieces and eating the skin of a horse which had been dead for some months." ‡ The famine of 1631 seems to have been still more terrible. "The numbers of the dead exceeded all computation or estimate. Coffins and burial were not thought on in the Deccan. . . . The towns and their environs, and the country, were strewed with human skulls and bones instead of

* Smith's Dict. of Bible, i., p. 611.

† This date is not certain.

‡ Blair, p. 16.

seed. Men ate each other; parents devoured their children. Bakers ground up old bones, or whatever else they could get, and mixing the dust with a little wheat flour, sold the cakes as valuable rarities to the wealthy. Human bodies, dried in the sun, were steeped in water, and devoured by those who found them."* The famine of 1770 brings us to times which have a more personal interest, for then we had just got possession of India. The lines written by Lord Teignmouth, quoted at the beginning of this chapter, do not appear to be exaggerated, horrible a view as they present. Mill's History states, on the authority of a letter of the Governor in Council to the court of directors, dated November 3rd, 1772, that more than a third of the inhabitants of Bengal were computed to have been destroyed. The commissioners on the Orissa famine, while referring to Mill's History, add "the most favourable statement is that, at the lowest computation, at least one fifth of the inhabitants of the British provinces perished."† Dr. Hunter says,

* Blair, p. 20.

† Report of the Commissioners appointed to inquire into the Famine in Bengal and Orissa, part iii., § 19.

"We cannot help arriving at the conclusion that the failure of a single crop, following a year of scarcity, had within nine months swept away ten millions of human beings."*

If possible a still worse picture of the horrors of the famine of 1837 is given in Col. Baird Smith's report of the famine of 1861. After saying "It is impossible to doubt the general fidelity" of the witnesses, he adds, "The daily burials by the police at Agra are reported to average nearly 400;" and refers to a general order, which runs as follows: "The Cawnpore division order of the 9th ultimo, directing the commissariat officer in charge of the Sudder Bazar to hire a boat with a small establishment, for the purpose of being employed in removing to some distance below the station the numerous dead bodies which have collected on the bank of the river, or which may hereafter be thrown ashore, is, for so long a period as the measure may be considered necessary, confirmed."†

In the Orissa famine of 1866 the people are com-

* Hunter's "Annals of Rural Bengal," p. 34. Mr. Blair says that 30 millions perished, p. 32.

† iii., p. 58, note.

pared to "passengers in a ship without provisions." Things came to such a pass that money was spurned as worthless. Prices were constantly merely nominal. "During the famine people seem to have survived for a time as living skeletons, reduced to a state which would have been impossible in a colder climate."*

It may be asked, Why tell us these horrors? We do not care to hear them. Yes; but it is difficult otherwise to realize the sufferings of our fellow-men, and without realizing them we shall not be willing to devote much time or energy to preventing or alleviating them. What was it but a realization of the horrors of famine that stirred up England to demand the alleviation of the Bengal famine last year? The newspaper reports may have been exaggerated in some details, but their aim was good, and it was successful.

Nor is it fair to take only Egypt and India as examples. The description of the famine in Asia Minor, in the pamphlet published by the *Levant Herald*,† would not be credited if it were not written

* Orissa Report, i., § 70, 71.

† "The Famine in Asia Minor: its History. Compiled from the pages of the *Levant Herald*."

by those whose trustworthiness cannot be doubted. To quote one or two passages almost at random :— "One's heart bleeds to see the poor wretches. There were strong men, whining and crying like children for a morsel of bread; mothers with infants at the breast slowly but certainly dying, unless immediate and extensive relief comes. . . . Money they all, or nearly all, refuse."* "To the south whole villages are being depopulated. They pour out their famished inhabitants, who come in troops upon us—haggard, ragged, emaciated beggars, some of them almost in a dying condition when they get here."† "These people are not only destitute of food and of flocks; they have no growing grain. Before the sowing season came the seed was eaten and the oxen died."‡

* P. 14. Letter from Mr. Thomson, dated May 6th, 1874.

† P. 30. Letter from Rev. Mr. Tracy, of Marsovan, May 2nd, 1874.

‡ The most striking commentary on the famine in Asia Minor is found in some statistics of it that are published as a loose fly-sheet with the pamphlet. Without quoting details, it will be enough to state that—

1st. In 42 villages of the Caza of Keskin the population

in 1873 was	16,900
Ditto in 1875	9,261
	7,639

After reading an account of the famines in distant parts, that in Ireland will appear to be but slight. The mere fact that this is so may help us to realize the horrors of famines in those countries that are far more removed from centres of civilization. If Ireland, which is part of the richest kingdom in the world, and is favourably situated both for informing others of its need, and for obtaining help,—if Ireland suffered to such an extent, what is likely to be the amount of the suffering in other lands less fortunately situated? In November, 1845, the Dublin Mansion House Relief Committee say that "considerably more than one third of the potato crop has been already destroyed by the potato disease, and that such disease has not by any means ceased its ravages, but, on the contrary,

Of these 7639 persons 4997 are supposed to have died, and 2642 to have dispersed.

2nd. That the population of the 160–170 villages belonging to the Caza of Keskin was in 1873 . . 52,000

Approximate number of deaths 20,000

32,000

Ditto of population dispersed 7,000

Existing in 1875 25,000

that it is daily expanding more and more, and that no reasonable conjecture can be formed with respect to the limit of its effects, short of the destruction of the entire remaining potato crop." * On January 20th, 1846, the Irish Commission of Inquiry report that "It appears from undoubted authority, that of thirty-two counties in Ireland not one has escaped failure in the potato crop. And of 130 Poor-Law Unions, not one is exempt." † By March, 1846, the effects of the famine began to be evident. Riots took place in many towns. "At Castlebar market potatoes were from 2½*d.* to 5*d.* per stone, and oatmeal from 13*s.* to 16*s.* per cwt." At Carrick-on-Suir it is said, "This town is in a horrible state. The populace rose, and broke into all the meal and provision stores, and afterwards into the shops generally." ‡ On December 5th the report from Skibbereen is, "Hunger, nakedness, sickness, and mortality, almost equal to the ravages of an epidemic disease, are the prevailing features of the dwellings of the poor. . . . The number of deaths

* Quoted in "Annals of our Time," p. 185.

† *Ibid.*, p. 191.

‡ *Ibid.*, p. 197.

which took place in the infirmary during the month of November was 87."* One more quotation will be the last. "Day by day," writes the *Dublin Evening Post*, "the accounts that reach us are becoming more horrifying. There is scarcely a county in Ireland, unless Kildare may be an exception, in which the people are not dying of starvation. . . . A correspondent from Drogheda writes that wretched women and children were to be seen on the decks of steamers trying to appease their hunger with the turnips half eaten by the cattle on board."†

If, as we have seen from history, the direct effects of famine are so terrible, it will readily be believed that its indirect effects are no less important. The country in which the famine takes place is injured in population,‡ commerce, and general prosperity.§ Those countries also which are connected with it by politics or commerce will proportionately suffer.

Is not our interest in "the famine question" grow-

* "Annals of our Time," p. 212.

† *Ibid.*, p. 214.

‡ *Cf. supr.*, pp. 5–7.

§ *Cf.* also the disorganization of society and the bands of plunderers in the N. W. P. Famine of 1837. Colonel Baird Smith's Report, iii., § 57.

ing? We in England may feel pretty comfortable in the thought that here we shall never endure the horrors of a famine, great as we have seen them to be; but if a famine, or a war, affects us through our world-wide commerce, shall we not ask ourselves what causes a famine, and what will prevent it?

In the present instance it is only famines in India that have to be considered. India has lately had a considerable share of public attention. The recent famine made almost all classes take an interest in it; and that this interest has not flagged, may be seen from the fact that in the current number of each of the three leading Quarterlies there is a paper devoted to some subject connected with India.* Moreover during the next year India will become still better known to the general public through the visit of the Prince of Wales.

* The *Quarterly Magazine:* "Indian Missions." The *Edinburgh Review:* "The Geology of India." The *Westminster Review:* "Our Position in India." The variety of subjects shows the interest taken in India generally. This interest is seen also in the Rede Lecture, by Sir H. S. Maine, being on "The Effects of Observation of India on Modern European Thought," and in the proposal that some of the selected candidates for the Indian Civil Service should reside at the universities.

Although the interest taken in Indian affairs is already great, yet few would assert that it is as great as it ought to be. Without taking into account the immense number of its inhabitants,* the opportunities that it affords for ethnological and philological research,† its materials for the antiquarian or the botanist, we affirm that every Englishman ought to know more of a land that is so important on political, social, commercial, and religious grounds.

On political grounds, because India belongs to England, and is the finest jewel in the British crown. That jewel can never shine with its true lustre unless there be removed every roughness and impurity. The recurrence of famines in India is one of many things which hinder the affection of its people towards us, and tarnish our true glory in the east. Socially, Englishmen should take an interest in it, for there are few of us who have not relations residing there. Its commercial importance is so evident that one need refer only to the Statistical Tables in the

* In British India alone the population is 193,223,418 souls. (*Vide* Blue Book for 1872–73, Statistical Table I.)

† "About fifty different races, speaking a great diversity of languages."—*Hunter's* "*Orissa*," i., p. 11.

Report of the Progress of India for 1872–73, where it says that in that year the total value of its exports amounted to 55,22,74,950 rupees,* of which the United Kingdom had 28,22,79,308, and its imports to 31,26,05,614 rupees,† of which the United Kingdom had 24,75,56,631.‡ The connection of Manchester and Calcutta is proverbial. Again, from a religious point of view, there are few countries which so demand our sympathy as India. Much has been done there, if the great number of its population is considered; but much, very much, is yet to be done. That Christianity will ultimately triumph in India as it triumphed in Rome, no one who believes in the Divine authority of Christianity can doubt, but that its progress there is met by many difficulties no one will deny. The conversion of India will be a fresh evidence to Christianity, and India itself, when converted, will be the key to the conquest of Asia.

Having thus seen the importance of the subject

* 53,44,03,833 being from "produce and manufactures," 1,78,71,117 being from "articles of foreign merchandise." The sum = about £55,000,000.

† About £31,000,000.

‡ *Vide* Statist. Tables.

of famines generally, and particularly in the case of India, it would be well to give a brief sketch of the plan of the following essay. But before doing so it is necessary to define the sense in which the word "famine" will be used. The various writers and authorities that have been referred to while studying the subject, use the word in two different senses. They may be called the more exact and the more popular meanings of the word. Taken in its more exact sense "famine" means that "the supply of food existing in the country is, apart from the question of price, insufficient for the support of the people."* There is in the country "a natural scarcity which may or may not become actual pressure."† In this sense it can be said of England that "There is an insufficiency of grain in the country for the support of her population; in short, *there is a famine yearly in Britain. England is always in a chronic state of famine.*"‡

The other and more popular meaning of the term is that used by the Orissa commissioners, who say,

* Sir J. Strachey, quoted by Blair, p. 131.

† Compare Hunter's "Annals of Rural Bengal," p. 50.

‡ Blair, p. 126. The italics are his.

"We will use the word famine in its ordinary and popular acceptation of suffering from hunger on the part of large classes of the population." *

The latter use of the word will be taken in the following pages. The reasons why it seems preferable are, first, that it is the popular use of the word. It is the meaning attached to it when any past famines are spoken of. Moreover, a man would, before most audiences, be laughed at if he solemnly stated that there is a famine in England now. Secondly, that such a state as that meant by the technical use of the word is not necessarily injurious to the country. In England, as has been observed, there is always a natural scarcity of food, but the "actual pressure" is never felt; because, as Dr. Hunter says, "The whole tendency of modern civilization is to raise up intervening influences which render the relation of actual pressure to natural scarcity less certain and less direct, until the two terms which were once convertible come to have very little connection with each other."† Probably those who have the most sanguine hopes of India

* Orissa Report, i., § 79.

† "Annals of Rural Bengal," p. 50.

would be contented if she were as free from famines, in the popular sense of the word, as England is.

But here it may be objected that England is not injured by its "natural scarcity," because it obtains supplies from foreign countries; whereas if the natural supply of India runs short, she has no place whence she may obtain the food that she requires. Therefore, they say, the real question is, how to prevent the natural scarcity of food in India, and therefore the more exact use of "famine" is preferable.

But this objection, though plausible in theory, need not in reality much trouble us. For, in the first place, the natural supply of India, as a whole, has never yet been known to run short;* and, in the second place, supposing that in the course of the next forty years, the population were to become so large that there could not be grown enough food in India itself, we have no right to say that "she has no place whence

* *Vide infr.*, p. 85; *cf.* also the words of Sir R. Temple, as to the supply of food that is produced in India as a whole. "It is a sign of the great resources of the provinces of India, that notwithstanding the drain on Northern India and Burmah during the past ten months, the price of food in those countries is at the present moment (October, 1874) about as cheap as in ordinary years."—*Report of Famine of* 1874, p. 31.

she may obtain the food which she requires," in our present ignorance of the resources of Central Asia. Therefore, as has been said above, the popular use of the term "famine" will be accepted throughout this essay.

The plan of the essay will be as follows:—It will be divided into two parts. The first of these explains the causes, the second discusses the possible prevention of famines in India. The first part will be divided into the two following heads,—those causes that refer to the natural supply of food from the land, and those that refer to the actual pressure upon the people. In the former of these two heads, there will be described the meteorology, climate, and water supply of India; the foods used in India; the state of agriculture in India. In the latter, the subjects of communications and of the social condition of the people will be treated of.

After considering whether prevention is *primâ facie* possible, or whether the above-mentioned causes are insuperable, the second part will be, as the first part was, divided into two heads,—measures which tend to avert the natural scarcity of food, and those which are directed towards the development of intervening

influences between natural scarcity and actual pressure.* Under the former of these two divisions will be discussed improvements of the systems of land tenure, irrigation, and other measures for improving the state of agriculture. Under the second head will come the subjects of communications, the study of meteorology, improvements in the administrative machinery, and emigration; the whole being closed by a summary of the discussion, and a statement of the conclusions that have been arrived at.

* *Vide* Hunter's "Annals of Rural Bengal," p. 54, quoted *infr.* (p. 80).

I. *THE CAUSES OF FAMINES IN INDIA.*

1. THOSE THAT REFER TO THE NATURAL SUPPLY OF FOOD.

i. THE METEOROLOGY, CLIMATE, AND WATER SUPPLY OF INDIA.

"India is throughout governed by one climatic system."—*Orissa Report*, iii., § 10.

"IN a country which embraces 27° of latitude, which contains extensive plateaux, elevated from 2000 to 3000 feet above the level of the sea—some of the most extensive plains in the world, almost on a level with, or but a few hundred feet above, the sea—the highest range of mountains in the world—tracts of bare rock—deserts of mere sand, and deep primæval forests,—it is needless to say that there must exist a very great diversity of climate."* Although this may be true to a certain degree, yet it is more true to say that throughout India there

* McCulloch's Geographical Dictionary: "Hindostan."

is but one climate and system of meteorology, even though this system may be influenced by the peculiar features of certain localities. The Orissa Report states the case fairly when it says, that "as regards climate, India is to a very great extent one country, and the course of the seasons similar in character, if not in degree."* The general truth of this statement, as well as the differences of climate that it hints at, will appear from a consideration of the physical features of India. India may be looked at as one country by itself, for although it is a part of Asia, its meteorology has little in common with the rest of Asia.† This is owing to the great chain of the Himalayan Mountains, which run along what may be called the base of the triangle.‡ It is impossible for the winds to cross these mountains, whether they blow from or to Central Asia. In comparison with these giants among the mountains, the other hills of India sink into insignificance,

* Orissa Report, iii., § 10.

† Except in the Punjab, which has spring rain in common with Western Asia. *Vide* Orissa Report, iii., § 10.

‡ *Cf.* Blue Book for India, 1872–73, p. 32. *Cf.* the words of Sir H. S. Maine: "Shut in by the Himalayas and their offshoots, it lies like a world apart."—*Rede Lecture*, p. 11.

although they are still of such magnitude as to materially affect the seasons and climate of certain places. Those that need be mentioned are the Vindhyan chain, running east and west through Central India, and the Eastern and Western Ghâts, running up each side of the Coromandel and Malabar coasts.

The seasons in India may be divided into wet and dry; or, still more accurately, into the hot, which corresponds with part of spring and summer; the wet, corresponding with part of summer and autumn; and the cold, corresponding generally with our winter months.* It will thus be evident that at that time of the year, when in other countries agriculture may be said to commence, that is in the spring, Indian agriculture is obliged to be almost suspended owing to the absence of rain.†

But in June the monsoons commence. These winds are caused by the action of the sun heating the land, and thus influencing the course of the trade winds, which instead of blowing from the north-east become south-west winds. Thus the monsoon comes

* *Vide* McCulloch's Dictionary: "Hindostan."

† *Vide* Orissa Report, iii., § 10.

first to the south-western coast, and also, there being nothing to hinder it, to the eastern shores of the Bay of Bengal. From the western coast it ought to go in a due north-east direction across the country, but it is much hindered by the Western Ghâts. By the time that it has reached the Himalayas it is much spent. It is there turned by the mountains to the north-west, which it waters with a gradually diminishing supply. "Towards the end of the season the monsoon trends to the east, and from that quarter most countries of India hope to receive the final falls of the season; while, when the wind has still further veered to the north-east, the residuum of the rain supply is thrown more abundantly on the hitherto exceptionally dry Madras coast."* The monsoons, as a rule, continue with intermission until October. From October to February the weather is cold, while in March the hot season again commences.

But we must discuss more fully the water supply of India, for it is on this that the peculiarities of Indian agriculture chiefly depend. For convenience'

* Orissa Report, iii., § 10. The dryness of the Madras coast is due to the Eastern Ghâts, which hinder the course of the monsoon.

sake the sources of the water supply may be said to be the rain and the rivers, although it is evident that the latter must depend greatly on the former, unless the country is, like Egypt, almost entirely rainless. At first sight India seems to be well enough supplied with water. With more than thirty rivers—whose streams are not less than 80 miles long, the area of whose basins is at least 3000 square miles—some of which, as the Ganges, the Indus, and the Brahmaputra, rank among the first rivers of the world,* it would appear that the loss of rain could easily be supplied from the volumes of water that year by year roll down into the sea. Nor probably is the amount of rain insufficient if it were spread over the whole country during the whole year. Enough has been said above to show that for the greater part of the year, namely from October to June, India is almost entirely without rain. As a consequence there is, as has been already stated, but little agriculture during that time.†

* The Ganges is 1514 miles long, and has a basin of 391,100 square miles. The Indus is 1800 miles long, and has a basin of 372,700 square miles. *Vide* Blue Book of India, 1872-73, map 4.

† *Vide* p. 21.

But if this were the only evil connected with the rain (that it came during a short time of the year) the natives would have become accustomed to this, and allowed for it many years ago. Therefore, the chief cause of the famines must rather be found in the uncertainty of the supply of rain when it does come, both in quantity and time. That the quantity of rain—the number of the inches of the rainfall—is important is easily believed ;* but it must be noticed and carefully borne in mind, that the exact time at which rain comes is of far greater importance. This will be seen more fully in the description of the cultivation of rice. It will be sufficient to say here that "a good or bad season depends often on the rainfall within a single fortnight." †

Yet on the other hand, it may happen that the rainfall is so great as to flood the country, and to spoil the young crops. This is generally caused by the rivers swelling, and flowing over the country round. Orissa is especially subject to these accidents, so that Dr. Hunter says that in Orissa floods are

* The quantity that is required for the various kinds of foods is discussed below, pp. 33, 34.

† Sir Bartle Frere, p. 13.

more to be feared than drought.* He indeed limits this statement by adding that "while floods as a rule cause more suffering and scarcity than droughts, a total absence of rain produces the climax of misery,"† but the mere comparison shows that floods may be an important cause of famine. The chief reason why inundations are not so bad as droughts is, that the former are "for the most part confined to comparatively limited tracts, the people of which may be said to be in some degree habituated to them." ‡

In Orissa the floods are of two kinds,—those caused by inundations of the sea, and those caused by the overflowing of the rivers.

Speaking of the former, the Orissa commissioners say, "The most intense calamity of the present century (in Orissa) seems to have been the inundations of the sea on the Balasore coast in 1831–32."§ Embankments are raised against the sea, which are successful in proportion as they are properly kept up. But the inundations from rivers have at present more

* "Orissa," ii., p. 175.
† *Ibid.*
‡ Orissa Report, i., § 52.
§ *Ibid.*

interest for us. The reason of the floods is well given by Dr. Hunter. "Three great rivers collect the drainage of 57,000 square miles of Central India, and gradually converging towards the coast, dash down their accumulated waters within thirty miles of each other upon the Cattack district. The velocity which they had obtained in descending from the inner tableland finds itself suddenly checked upon the level delta, and they break out into a hundred tributaries, like a pitcher of water thrown violently upon the ground." * Of course there are channels for the water through the delta to the sea, but these are sufficient only for the hot weather, and are far too small in the wet season. "Only one half of the flood, therefore, can find an outlet through the deltaic distributaries to the sea. The other half bursts over the banks, and sweeps across the country." † The damage that it does may be imagined; but this does not cease with the destruction of the crops, for owing to the deltaic channels being by successive embankments raised above the land, and on the highest part of the land, it is impossible for the water to flow back

* Hunter's "Orissa," ii., p. 176.

† *Ibid.*, p. 179.

into the stream again, so that "the waters cover the crop-land long after the river itself has subsided. They painfully search out the lines of drainage, accumulating in swamps, drowning the harvest, and poisoning the land with malaria, until they dry up or slowly reach the sea." *

But the reader will have a more accurate idea of the devastations which the rivers commit by seeing the statistics of the flood in 1866.

"Throughout the three districts 1050 square miles were destructively inundated, the waters lying from three to fifteen feet deep in most parts for thirty days, and in some places during sixty. A population of 1,308,365 souls suddenly found their homesteads submerged, and crops to the value of £3,109,472 were destroyed." "These figures." Dr. Hunter adds, "speak for themselves, but they do not tell the whole truth. The province was just emerging from the terrible famine of 1865-66; the people had used up their last remnants of food, and were looking forward to the approaching harvest as their one chance of safety, when the rivers sprang like furious beasts of prey upon them, and drove more than half the surviving

* Hunter's "Orissa," ii., p. 180.

population out of house and home."* Of course the indirect harm done by floods is immense, involving, as it must, considerable expense to the government, both in trying to prevent them and in assuaging the sufferings of those immediately affected by them.

We have seen so far two important causes of famines,—droughts and floods. The former of these is indeed the more important, as it affects the whole of India, whereas the latter touches only certain parts. Yet it must be remembered that each of the two causes has peculiar compensating advantages; for while floods sometimes cause the highlands to bear large crops, so droughts sometimes so act on the low-lands by these not being flooded as they are in ordinary years. †

We now turn to consider the nature and cultivation of the chief foods of India, which we shall be the better able to understand after that we have laid the foundation of the knowledge of the climate.

* Hunter's "Orissa," ii., p. 180.

† *Vide* Hunter's "Orissa," Statistical Account, p. 54.

ii. THE FOODS USED IN INDIA.

"Although a good Providence has given to man an almost infinite number of foods, all are not found everywhere, neither can man obtain all foods found round him."—*Dr. E. Smith.**

The common idea in England that all India is fed by rice will be found, like many other popular superstitions, to have but a small basis to rest on, and probably arose from the fact that our first settlements in India were in Bengal and on the coast of Coromandel.† It may indeed be allowed at once that rice is an important element in the food of India, for not only do the inhabitants of Bengal, Bahar, and Orissa live almost entirely upon it, but it is used in a greater or less degree throughout the whole of the country. But while the importance of rice is thus granted, the dry cereals both are the staple food of those countries where the rice cannot grow, and also form part of the food of Bengal, Bahar, and Orissa.‡ Wheat, for

* "Foods," p. 4.

† *Vide* Blair, p. 38, who quotes a note by the editor of Elphinstone. *Cf.* also Sir H. S. Maine's "Rede Lecture," pp. 13, 14.

‡ *Vide quot.* from Blue Book 1872–73. It does not indeed mention Orissa, but the importance of rice there may be gathered from the fact that it has there twenty-six names,

instance, is the principal food grain of Hindostan proper,* and various sorts of millet are much eaten in the Deccan. There are other less important foods used which are referred to in the note,† but they

according to the various stages of its growth. (*Vide* Hunter's "Orissa," Statistics, p. 45.)

* *I.e.*, the countries north of the Deccan.

† "Rice, the varieties of which are infinite, forms the principal food grain of Bengal. . . . In Bahar rice is also the main staple of food, though where the fields are high and dry, one of the two daily meals of the cultivators is usually of wheat, maize, or peas. Rice is, however, the favourite food; and the food of the ordinary cultivators is half of rice and half of other cereals, millets, and pulses. Millets (*kodo* and *murwa*) are the food staples of Gaya and Chota Nágpur; and barley, either eaten with salt and chillies, or ground with dal (pulse) and baked into chupatties, is the cheapest of all the food crops in Tirhut. In Patna and Sháhabad maize is largely used. Nor is rice the sole food of the ryots of Bengal. Millets are raised after the rains, and reaped in March, and many varieties of dal (pulse) are reaped in the cold weather. Among the *turkari*, or vegetables, of Bengal brinjals are the most common, yielding two crops a year in almost every garden; while a gourd called *koomra* may have been seen trailing on bamboo stages round almost every ryot's hut. The fish-eaters use *huldi* (turmeric), and other ingredients of curries, such as ginger, coriander, cummin, aniseed, chillies, are commonly grown. Potatoes are chiefly found in Assam and the hill districts: the crops on the Khasi hills yielding about 185,000 maunds.

In the Upper Provinces the people are less dependent on rice,

need only a passing mention on account of both their comparative unimportance and the great space that would be taken up by a description of them.

Rice, the *ὄρυζον*, *ὄρυζα*, or *oryza*, of the ancients, has been cultivated in India from time immemorial. There are so many varieties, that in Ceylon alone 161 have been counted. "In general rice grows like wheat, with a stalk about four feet long, which is rather more closely jointed than that of wheat, and with leaves like that of the leek. Several stems form at the top, bearing clusters of the grain resembling those of wheat, each terminated with a beard and enclosed in a rough yellow husk."*

There are two main crops of rice. There is the

and other cereals take its place; and in the Madras and Bombay presidencies, the dry grain crops form the staple food. In Mysore the *ragi* (*Eleusine corocana*), a dark and very small grained millet, forms 66 per cent., and rice only 24 per cent., of the whole cultivation of the country. Throughout the Bombay presidency, *jowari*, or great millet, is the staple most cultivated; *bajri*, a smaller millet comes next; and rice only takes the third place. Bajri and jowari are also the principal food grains grown in Sind."—*Blue Book for* 1872-73, p. 34.

* New American Cyclopædia: Art. "Rice." The Carolina rice has a stem sometimes six feet high. The height of the stem really depends on the depth of the water in which the plant is grown. *Vide infr.*, p. 33.

early crop, called "aus" in Bengal, gathered in September. This is raised chiefly upon high level lands, and is of a coarser kind than the second crop, but is very useful if the previous year has been bad.* The second crop, called "aman" in Bengal, is the most important one, and as it is on this crop that the welfare of the people mainly depends, we must describe its growth more at length.

Dr. Hunter gives a summary of the operations required for it in Orissa, if it is of the kind that is not transplanted. There takes place (1) ploughing, March or April; (2) sowing, May or June; (3) weeding, after first rainfall; (4) harrowing and ploughing, July or August; (5) second weeding, August; (6) laying (arranging the crop for convenience of cutting), December; (7) reaping, December or January. After this it is threshed and scalded, so as to loosen the husks, and finally "cleaned," *i.e.*, separated from its husks.† This rice is sown in beds of pools and rivers, and as the water rises the rice grows with it, the stems being some-

* It was this crop which was of so much help at the end of the last famine. *Vide* Sir R. Temple's Minute, p. 35.

† *Vide* Hunter's "Orissa," Statistics, p. 14.

times twelve or even twenty feet long.* If it is of a kind that is transplanted, it is moved in August, when about a foot high, to land on which there is about ten inches of water.†

It will be at once apparent that a great quantity of water is requisite for the proper growth of the rice. The exact amount of the rainfall that is necessary is not certain. Dr. Hunter says that, "Recent experiments show that 35 inches, even in the drier climate of inland India, render it possible to rear the rice crop."‡ Mr. Blair, however, says in a note at the end of his book, that "the Madras estimate of the requisite quantity of water required is one cubic yard per hour per acre during the period that the crop is on the ground, viz., about five months. This is equivalent to nearly 5½ inches continuous rainfall per month; but as a matter of fact, 'the rain of course does not fall at all regularly, and probably nearly double that quantity, or 50 inches for the five months the crop is on the ground, would be neces-

* *Vide* Blue Book, 1872–73, p. 34.

† Besides this, there is a kind of rice called "boro," which is raised in lowlands, and especially on the edges of swamps and jheels. Its crop is reaped in April and May.

‡ "Orissa," ii., p. 175.

sary to do what is requisite; and even this would not suffice unless regularly distributed. . . . On the whole I should say that a fall of 60 inches will not secure rice without artificial irrigation. . . . The Orissa rainfall is about 60 inches.'" The amount of yearly rainfall is really of little importance, for sometimes the rainfall for the whole year has been as great as usual, or with but a slight deficiency, and yet there has been a famine; while on the other hand there has been often the usual quantity of rice with a less quantity of rain. That which is truly important is the exact time at which the rain falls. It has been shown that the rains of India do not fall in driblets, as in England, throughout the year, but are of short duration.* Sir Bartle Frere says, "a good or bad season depends often on the rainfall within a single fortnight." The importance of this is seen in the history of the famines of 1866 and 1874.

"The natural cause of the scarcity and famine (of 1866) may be simply stated to be the premature cessation of the rains of 1865 throughout the Lower Provinces of the Bengal Presidency, in the middle

* *Vide supr.*, p. 33, and compare Blair, p. 137.

of September, 1865.* Speaking generally, it may be said that no rain of any consequence fell after the middle of that month. The total quantity of the rainfall for the year was not unusually small in most of the districts of Bengal, but it fell abnormally and out of time. Much rain fell early in the season, before the usual time for sowing had arrived, and when its continuance could not be depended on;

* Orissa Report, i., § 17. In § 56–58 are given the amounts of the rainfall during the various months of 1865. Those for one district, Pooree, were as follows :—

POOREE RAINFALL.

Average rainfall for the year about 60 to 65 inches.

Fall of 1864 about	41·8
„ 1865 „	36·3
„ 1866 „	72·2

AVERAGE FALL IN INCHES OF THE 13 YEARS PRECEDING 1865.		FALL IN 1865.
May	2·1	13·
June	9·2	5·6
July	12·2	4·3
August ...	17·3	5·6
September ...	16·8	5·2
October ...	9·4	0·0
November ...	1·8	0·0

Orissa Report, i., § 56.

N.B.—Although the total fall in Orissa was thus considerably less than usual, this fact does not militate against the

while the latter rains, which are usually expected in the end of September and October, failed."

The case of the Bengal famine of 1874 was very similar. The summer had been extraordinarily hot, and the rain had been barely enough to mature the early crop which is gathered in August or September. But little or none fell during the whole autumn, "when heavy showers are indispensable for insuring the maturity of the rice crop of December." * Sir Richard Temple well describes the need of the rain at this time. Speaking of the fears entertained at the same period in the year *following* the famine, he says, "Nor was there any rain during the first days of September; at that time the greater part of the principal rice crop (for the winter) remained to be transplanted. This crop is sown in seed-beds among the fields. These beds become by the middle of August full of seedlings. The tender plants are then rapidly transplanted into the surrounding lands, which should have become very

statement above about the importance of rain in September; but, as the famine of that year was worse in Orissa than in Bengal, shows that want of rain in the previous months of the year makes it more necessary in that month.

* Sir R. Temple's Minute, p. 8.

wet from constant rainfall and flooding. But now the first week in September was passing, and yet the seedlings could not be transplanted, because the lands were dry, the soil in many places cracking into fissures from the drought. The very seed-beds were beginning to fade or wither. The trans-planting had been already delayed to an extreme degree. After a very few days' more drought, the process would be impossible. It were superfluous to dilate on the crisis which was imminent. Alarm spread among the people, prices rose, and dis-tress increased." * Most fortunately in that year rain came down almost at the last moment, and so another year's famine was averted; but in 1873 the consequence was, to again quote from the same authority, that, where in ordinary years many square miles of rice harvest might be seen, "in the autumn of 1873 the crop grew up, then faded, and at last withered. The colour became brown, deepening by the effect of distance into red," † and the dreaded famine became almost a certainty.

Whilst discussing the cultivation of rice in India,

* Sir R. Temple's Minute, p. 37.

† *Ibid*, p. 44.

we must notice the total absence of manure. Manure is scarcely enough used for all crops, * but it is never used for rice. Water is the only thing that the rice-plant needs, or, at least, receives. "Dr. Roxburgh states that he never saw or heard of an Indian farmer manuring in the smallest degree a rice-field. Yet these fields have probably for thousands of years continued to yield annually a large crop of rice, on an average from thirty to sixty-fold; even eighty or a hundred has been known." †

Wheat and millet have been referred to above as most important items in the food supply of India. About the former little need be said. Its cultivation in India is much the same as it is in England, although there are minor differences, owing to varieties of soil and climate. The state of agriculture in India will be discussed later on. It has been stated above that wheat grows chiefly in the north of India, and it was the want of wheat

* The true reason of this will be discussed *infr.*, p. 52.

† Penny Cyclopædia: "Oryza." *Cf.* the words of the Orissa commissioners: "In rice cultivation, water alone seems to be the alpha and omega. No rotation is required and no manure is necessary."—*Orissa Famine Report*, iii., § 42.

that caused the famines of 1837 and 1861 in the North-Western Provinces.*

Nor need we say much about millet. It is one of a large class of plants that are much used for food, of which maize is one of the most important. It is said to grow as "a stiff, reedy stem, some twelve or fourteen feet high, with a tuft on the top."†

Having now described the climate of India, and its effects on the cultivation of the foods grown there, we turn to examine the state of the agriculture.

iii. The State of Agriculture in India.

"Agriculture in India is susceptible of almost indefinite improvement."—*Blue Book for* 1872–73, p. 1.

In the present section it is proposed to treat briefly of those causes of natural scarcity which are to be found in the state of agriculture. This term will be used in a somewhat wide sense, so as to

* In 1874 the rice, not the wheat, in the N.W.P. was in danger because only the most eastern parts were affected, and in them rice is chiefly grown. *Cf.* the Report from N. W. P. on Famine of 1874, with Col. Baird Smith's for that of 1861.

† Dr. E. Smith's "Foods," p. 162.

include not merely the art of agriculture and the quality of the land, but also the tenure of the land. It is obvious that the supply of food will depend much on the condition of these things. For convenience the subject will be discussed in the following order: the tenure of the land; the alleged ignorance of the art of agriculture; the gradual deterioration of the land; and finally, the cutting down of trees and forests.

That the tenure of the land must have an important bearing on the subject before us, and may, if the rate is excessive, be a primary cause in producing a natural scarcity of food is evident. For if the land is to bear the greatest quantity and the best quality that its soil can be made capable of producing, the cultivator must both be able to obtain from it actual profits that are larger than he requires for the necessaries of life, and also have enough interest in the soil to make it worth his while to lay out improvements, which may be expensive and also not immediately reproductive.

As the whole subject of the land tenures of India is extremely complicated, and as it must be again referred to when treating of the possible prevention

of famines, it has seemed better to refer the reader to that part of the essay where the state of the land-tenures is described, and where the advantages of the several systems are discussed at length.*

It will be sufficient here to point out a few instances of mistakes connected with the land tenure which have been causes of past famines. These mistakes have been made in the rate and in the length of tenure. An instance of the former may be found in the famine of 1803, which affected only the North-West Provinces, as they are now called.† "The dearth," writes Mr. Blair, "was partly due to the shortsighted policy of the British government having imposed, simultaneously with the drought, heavier rates of revenue which the people were unable to bear."‡

Similarly when Sir Bartle Frere first knew the Deccan the cultivator was, from the principle of rack-renting, "always in a state bordering on starvation."§

* P. 87, etc.

† They were then called "The Ceded Provinces," having been obtained in 1801.

‡ P. 35.

§ P. 60. It is said also that the district of Cawnpore is still suffering from too high rates. "No district has ever suffered so

It is this cause among others that has produced the destructive famine in Asia Minor. Through the despotic policy of the Turkish government, which loves to domineer when it cannot govern, the provinces of Asia Minor have long been in a retrogressive condition. Under its feudal chiefs, the Dérébeys, fifty years ago industry was thriving. The products of the country, silk, wool, cotton, and leather gave in their manufacture (for they were also manufactured there) both employment and wealth. But the Turkish government destroyed the feudal powers, and by its exactions on wealth destroyed wealth. Gradually the manufactures of the West came into competition with the native industries, and, as always, the productions of the more civilized nations gained the day over the prettier but more costly articles of the East. Thus for the last fifteen years agriculture has been the mainstay of the Turkish treasury, and it is from this source, the very marrow of the population, that the money is raised which feeds the Turkish court. At first sight indeed,

much from bad administration as Cawnpore owing to excessive rates."—Quoted in paper by Mr. Clements R. Markham, in *Society of Arts Journal* for May 21st, 1875.

the tax on agricultural produce is by no means excessive, as it is only 12½ per cent.; but in reality it is far more, because the burden of the other taxes falls on agriculture, from its being the only productive industry in the country. The result was that the inhabitants had neither capital nor credit to withstand the famine, and fell an easy prey to its ravages.*

Instances of mistakes made in the length of tenure may be found in the famine of 1837. This was one of the chief reasons why that famine was so much worse than that of 1861 in the same parts—the North-Western Provinces.

Col. Baird Smith says, "From the time of our earliest acquisition of any part of these provinces up to 1833, our fiscal system, notwithstanding some improvements on the native methods which were gradually introduced, had been thoroughly bad. The assessments were excessive, unequal, and unintelligent. Fixity of demand was virtually unknown, and, with exception to a small part of Benares, no settlement exceeded five years in duration, while a few were annual and many triennial."†

* *Cf.* Pamphlet on Famine in Asia Minor, p. xi.

† Report dated August 1861, § 31.

Although a good deal was done in 1833 to remedy the evils, yet enough time had not elapsed for any change to have taken place in the prosperity of the people before the famine came. How fearful a famine it was may be gathered from the few notices of it in the introduction.* Passing over the old state of the Deccan, of which mention has already been made, we take the instance of Orissa. Here there had been a settlement for thirty years, and during the last few years of that time the agricultural position of the classes in Orissa had decidedly improved.† But it was to come to an end in 1867, and consequently in the last year or two before that date the price of property became uncertain, cultivation was discouraged,‡ and the people deprived of those means to resist famine which they would otherwise have had.

Reserving, as we said above, a fuller discussion of the subject to the second part of this essay, we

* *Vide supr.*, p. 5.

† Orissa Report, i., § 47.

‡ "Just before the famine commenced, the native landholders of Bengal had represented the discouragement to cultivation which the postponement of a permanent settlement caused in Orissa."—*Hunter's "Annals of Rural Bengal,"* p. 54, note.

pass on to consider other questions connected with the state of agriculture in India.

Most writers on Indian famines have said that the natives generally have a very slight knowledge of the art of agriculture, and that this ignorance is one of the chief causes of famines.* They assert that the natives, having, or being able to procure, the best means of raising their crops, through ignorance of the principles of agriculture do not avail themselves of their opportunities. On what grounds are these accusations made? Those who make them say that when water is to be had from irrigation works, the natives refuse to take it; that instead of using the excrements of the cattle as manure for the land they burn it; that they prefer their primitive ploughs and instruments of husbandry to the improved machines introduced by European energy. But before we accept this charge against the native agriculturists, we must remember that it is made by foreigners, and, as we shall have cause to infer, by men who, though deservedly valued for their official services, have but little

* *Cf.* the words of Sir Bartle Frere, p. 6, which would lead his readers to infer that such was his opinion.

knowledge of the principles of farming in either England or India. Those who have been practical agriculturists in India speak otherwise. They say that few Englishmen are competent to give an opinion as to the state of the science of agriculture in India. Few, if any, Europeans have mastered it. Those who know most of it praise the native systems as being well adapted for their several purposes. At a meeting of the Indian section of the Society of Arts in April last, the one point connected with Indian agriculture on which all seemed agreed was the knowledge of agriculture possessed by the natives. Mr. R. H. Elliot, the writer of the paper,* compares our attempts to teach agriculture to the natives by model farms to "teaching our maternal ancestors the art of oval suction." Dr. Burn said that there is in many parts of India "a very extraordinary knowledge and capability for agriculture," and that there are classes of men who know the subject as well as our best farmers. "It was one of the most beautiful sights

* Entitled "Measures and Suggestions for the Advancement of the Wet and Dry Cultivation in India." *Vide* the Society's Journal for April 9, 1875.

to see the drills they made, which were perfectly straight and even, and stretched in all directions." Mr. Peterson said "that the native knows the cultivation of his own soil far better than we could tell him." But though the authority of the speakers at this meeting, themselves well-known agriculturists in India, ought to be enough to carry conviction, they are not alone in their opinion. Sir George Campbell agrees with them. At a meeting of the section in January, 1875, speaking of Indian agriculture, he says, "We have not mastered the subject. Not one of us has really mastered it to that degree that we can in any really practical respect show the natives how they can improve their system." "Almost the only article," he adds, "in respect to which we have attained by European methods a considerable improvement is indigo." And again, at the end of the conversation, he says that the natives show a considerable amount of skill and agricultural knowledge in using methods to supply the exhaustion of the soil, being perfectly conversant, for instance, with the rotation of crops.*

* *Society of Arts Journal*, for January 29, 1875. *Cf.* his remarks in his "Modern India," p. 64.

But surely, it will be said, the natives are wrong in their rejection of the irrigation water, in their waste of the manure, in their preferring the clumsier methods of agriculture to those used by more civilized nations. Yet what if sometimes the water supplied from the irrigation works be absolutely hurtful to the soil?* Is not this an excuse for even the inhabitants of those places where this is not the case refusing to use the water? What if burning the manure be the means of more manure being placed on the land? That this is so may be gathered from the fact that in the first place nearly all the essential parts of the manure are uninjured by the fire;† and in the second, that as the dung is used for fire every atom is carefully collected, which would not be the case if it were used for manure in its natural state. As to the third head, this is simply caused by the excess of supply over demand in the labour market. Where the agriculturists can obtain human labour so cheaply they will not use improved machinery,

* That it is hurtful in certain parts will be shown later on. *Vide* pp. 115–117.

† *Vide* Mr. Elliot's paper mentioned above.

which helps to supply the need of human labour. The natives do not mind how often they plough, for they can obtain as much help as they require at so low a cost.

Truly the complaint made against the native agriculturists seems to be much like the charge made against the bees. It is said that Réaumur, the mathematician, being much struck with the economy displayed by the bee in making her cells, proposed to König the following problem:—given a hexagonal vessel terminated by three lozenge-shaped plates: what are the angles which would give the greatest amount of space with the least amount of material? The sum was worked out, and it was ascertained that the bees were certainly clever, that they made their cells of a very good angle to be sure, but that they were not quite right. "What a pity," the world exclaimed, "that the bees did not know their own business a little better!" The story goes on by saying that for many years the bees were supposed to be wrong, until Maclaurin, the well known Scotch mathematician, thinking it strange, tried again with a newer and more perfect table of logarithms, and, as might have been an-

ticipated, discovered that after all the bees knew more of their own business than their would-be critics.*

Yet in deciding on the various accounts of agriculture in India that are given us, we must remember the wide field of observation. Some parts are doubtless much better cultivated than others. Certain tribes seem born to agriculture, others have little idea of it. Colonel Baird Smith, while commenting on the contrasts within the tract of famine of 1861, says that these depended in a great measure on the moral qualities of the races who possessed the land. "Isolated estates," he says, "held by Jats, Aheers, or proprietors of other good tribes, in the very heart of a bad tract, will constantly be found in tolerable cultivation, and at least the utmost made of their poor resources that human industry could make of them. No such efforts are ever made by the tribes who have no natural genius for agriculture. They sink helplessly beneath the pressure

* *Cf.* Wood's "Homes without Hands," pp. 428-430. The angles of the lozenge-shaped plates at the end of the bee's cell are 109° 28′ and 70° 32′. König's calculation of the best possible angle was 109° 26′ and 70° 34′.

of unfavourable physical conditions, and fulfil no single function of a proprietary class; not even the function of tax paying." * So important a cause does Colonel Baird Smith consider it, that in his report he has inserted a map of the famine district, coloured according to the race of its various proprietors, so that by comparing this map with another, showing the worst districts of the famine, the above remarks are easily verified.

It thus appears that we have no right to set down the ignorance of agriculture on the part of the natives of India as a cause of famine; for although it may be at once granted that their agriculture is not perfect (for what thing connected with the human understanding is perfect?) yet we deny that it has much more effect in producing famines in India, than the want of scientific knowledge on the part of our English farmers has on the cost of wheat in England after a bad season.

But notwithstanding the knowledge which the natives of India undoubtedly possess with regard to agriculture, few will deny that the land generally is suffering a gradual deterioration. Year after year

* Report dated 25th May, 1861, § 14.

its resources are drawn upon, and though it is in some measure relieved by the rotation of crops, but little is given to it, while much is taken away. It has been shown above* that no deterioration of rice-land is supposed to have taken place. The remarks in this division will therefore apply only to the dry crops.

The great need of Indian agriculture is manure. "Manure is so scarce," writes Mr. Carnegy, "that only the best lands can be treated with it."† Mr. Elliot says, on the authority of a native district officer, resident at Madura, "I have not known a case in which, even with the greatest care, a ryot would have been able to secure by collecting the dung of his own cattle, sweeping, etc., of his house, a quantity of manure sufficient for his field; nor can any be purchased at any reasonable price, since every one is careful to collect as much manure as he can."‡ What is the quality of the manure that is so small in quantity? It is confined to such simple material as ashes, and what is pro-

* P. 38.

† "Land Tenures of Upper India," p. 111.

‡ *Vide Society of Arts Journal*, for April 9th, 1875, p. 448.

duced by the people and their cattle.* In Orissa it consists chiefly of cowdung, eked out by the black mud from the bottom of tanks and river deposits.† Mr. Elliot shows how poor the cattle manure generally is, from the fact that the cattle themselves are insufficiently fed. "Whence then," asks the practical agriculturist, "is to be supplied the phosphoric acid, lime, and potash, which he sees carried off, partly to be eaten by the farmer, partly to be exported to pay his land-tax? and whence that vegetable matter which is so necessary, not only for its constituents, but for the effect that it has in maintaining the texture and absorptive powers of the soil? . . . How, then, is the soil to be maintained even in a fair state of fertility? The answer simply is, that under existing circumstances, the soil never can be kept in any other than what we should describe as a very low and exhausted condition." ‡ Unless this condition can be remedied by supplies of manure, it is clear that an important cause of famine will be left untouched.

* Carnegy, *loc. cit.*

† Dr. Hunter's "Orissa," Statistics, p. 18.

‡ *Society of Arts Journal*, April 9th, 1875, p. 448.

How it is proposed to supply the manure, must be left to the second part of this essay.*

It may indeed be at once stated that the want of manure is partly caused by the cutting down of forests and trees. It is not, however, the intention of the writer to show here how the growth of trees influences the supply of manure, but rather how their destruction produces change in the physical nature of the country. The effect of cutting down the vegetation in the South of Europe or in Palestine is well known, and we should reasonably conclude that the same course of action would have similar effects in India. It is, however, but fair to say that considerable doubt exists whether the destruction of trees in India has as yet caused any material change in climate or amount of rainfall.†

* *Vide infr.*, pp. 129–131.

† Compare the words of Sir George Campbell. "With regard to the destruction of trees he was not prepared to give so confident an opinion, but his impression was that the destruction of trees and denudation of mountain tracts had not gone on to the same extent as had produced so pernicious an influence in Europe. A considerable destruction of timber trees had taken place undoubtedly, but in many parts, where cultivation did not take place, the greatest evil was that useless jungle sprang up in the place of useful

More important is the effect of trees and forests in, as it were, detaining the water on the surface of the soil, instead of letting it flow down the watershed into the river and sea. "Where the mountains are bare the rain rushes down in torrents, giving rise to sudden and destructive floods at the outlets on the plains, and to most injurious freshes in the irrigating rivers; and the supply is uncertain and capricious during the dry season. The same rapid surface drainage destroys roads and bridges and does other injury both in the hill tracts and on the plains. On the other hand, where the forests are preserved, the superficial drainage is gradual, the springs are better supplied, and the dry weather

trees; and he was not inclined to think that in those parts with which he was acquainted they had suffered much from that cause."—*Society of Arts Journal*, Jan. 29th, 1875, p. 190.

Similar are the words of the Government Report on India for 1872-73. "Though every grove and clump in the dry tracts is a blessing, the value of which cannot be too highly estimated, yet Dr. Brandis, and other officers of great experience, are doubtful whether there is sufficient evidence to show that a material deterioration of climate has been the result of denudation in any part of India, or that the preservation and extension of forests will increase the rainfall." —P. 90

discharge is gradual ; so that the water is husbanded, either to supply tanks and lakes, or to ensure regularity and safety to great irrigation works in the plains."* How useful a protection trees afford to flocks and cattle is evident to any who have watched the care with which at lambing time the sheep are put into the most protected field, or who know of the trouble taken by shepherds of all countries to place their flocks under cover of a hill or in some other place away from the wind.

It is therefore in these two latter points that the destruction of trees has in India produced an evil effect on agriculture.

We have thus completed our account of those

* Report for 1872–73, p. 90. *Cf.* Mr. Moncrieff's description of Spain. "The whole country is furrowed by rivers running in deep beds, and fed by natural drainage lines scored over its face, and generally dry. The slopes, entirely devoid of vegetation, can offer no resistance to the corroding action of water, and possess no means of retaining the moisture. So the rainstorm over, the torrents run for a few days in flood, and return to their extreme dryness." Mr. Moncrieff attributes this "to the infatuated dislike that the people have for trees, which has caused them recklessly to clear away whole forests, and never to plant a tree unless valuable for its fruits."—*Irrigation in Southern Europe*, p. 92.

causes which produce a natural scarcity of food. They are, briefly, the peculiarities of the Indian climate, the nature of the foods that are grown there, and finally the state of agriculture. We now turn to those causes which affect the difficulty of procuring food even when it exists in the country.

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2. THOSE CAUSES THAT REFER TO THE ACTUAL PRESSURE OF SCARCITY UPON THE PEOPLE.

"Famines may arise, not only from a want of food, but from inability to obtain it."*

It was stated in the Introduction that the amount of food was by no means the only cause of famines (following the meaning of the word which we adopted) in India or anywhere else. It is obvious that much will depend on how far the food which is in the country can be used by its inhabitants. This branch of our subject will naturally divide itself into two heads,—the want of communications in India, and the social condition of its people.

* Quoted in Col. Cautley's Report on the Ganges Canal, vol. i., p. 52.

i. The Want of Means of Communication.

To see the effect of an almost perfect system of communications on a land that would otherwise be nearly starved or at least lose its place among the nations, one need look no farther than our own country. Imagine Great Britain with its many inhabitants and its little land * shut off by a sudden war from all communication with the outer world. What would become of the energy and the industry of Englishmen if there came not the shiploads of wheat from America, and the beef from France, to say nothing of the total cessation of demand for our iron and our manufactures.†

It must be remembered that the want of communications in parts of India often produces worse effects now than in past years. The reason is that because the exportation of food is much greater, the storage of food is considerably less. In the days of Alá-ud-din (1296-1317) it was ordered that the corn which

* The population of Great Britain averages 260 to the square mile.

† A fuller comparison of England and India with regard to communications will be found in the second part of this essay, for which part is reserved much that would otherwise be said here. *Vide* p. 146.

was paid as tribute should be brought into granaries in the city of Delhi. The effect of this storage of grain was that whenever through any cause the supply of food ran short the stores were opened and sold according to the wants of the people.* "Modern enterprise," write the Orissa commissioners, "and means of communication in relieving countries insufficiently supplied, drain those in which grain is abundant to an extent which probably did not occur in the old days of native hoarding. In fact, in India, where famines have generally been present to the memories and traditions of the people, the want of means of communication was much counteracted by the disposition to hoard largely the grain for which little could be got in years of abundance. An unhappy combination of circumstances which renders exportation in time of abundance large, but brings no importation in time of want, produces such a terrible calamity as has just occurred in Orissa." †

An apt illustration of the remark made by the Orissa commissioners relative to the storage of grain

* Blair, p. 11.

† Report on Famine of 1866, i., § 74.

that still exists somewhat in those countries which have been used to famines* is afforded by the history of the Bengal famine of 1874. In December 1873 the British Indian Association were confident that "the stock of old rice in the country was not such as in any way materially to supply the deficit in the yield of the current year's crops." Sir R. Temple also examined the question himself, and concluded that the government grain would be needed by February 1874. The result, however, showed that the stocks of food in the distressed districts were larger than they were supposed to be. "Up to the end of April only 14,000 tons of Government grain had been consumed as compared with a consumption of 57,000 tons anticipated in the estimates."† So great an importance do some ascribe to the old system of storing grain that Dr. Burn said at a meeting of the Society of Arts that he believed the fatal result of famines "might be prevented by reverting to the ancient village sys-

* Not as Orissa where there had not been a famine since 1792, nor any calamity since the inundation on the Balasore coast in 1831. *Vide* Orissa Report, i., § 52.

† Sir R. Temple's Minute, p. 54.

tem, under which a sufficient store of grain was kept in each village for one or two years' consumption, together with a like quantity of fodder for the cattle, and an ample supply of water in the tanks."* No doubt the slight provision against scarcity that is made nowadays by storing grain is partially compensated for by the existing means of communications. They take away the grain and in some measure take it back; but where, as in Orissa, the means of exportation are better than the means of importation,† and the people are accustomed to the one and have not had practice in the other, the pressure of famine falls upon them more heavily than it would have done in former years.

But Indian famines might, it seems, in every case have been prevented had there been a good system of communications. To give here only a few instances. In no certain case has famine in

* *Journal of Society of Arts*, for Jan. 29th, 1875, p. 189. The writer in thus citing Dr. Burn's opinion by no means intends to approve of the proposed adoption of this system.

† Because in Orissa the food is exported by sea at certain times of the year. Help was needed in 1866 at a time when the coast was not open for importation, and had to be conveyed by a single road along the whole length of the country.

India extended over the whole land. The famine of 1770 in Bengal was indeed disastrous, but there was abundance of grain in the neighbouring districts, both on the south-west and north-west.* Orissa was famished in 1866, but the scarcity was slightly felt in South Bengal, while the rest of India had its usual supplies. Had western Rajputana been less isolated, and possessed a few more roads, or the railway which is probably now finished, it would not have suffered in 1868.† Similarly, the want of communications has been one of the principal causes of Asia Minor famine. In the first place the complete isolation of the villages during the winter prevented the existence of a famine being known. The tracks, for means of communication there are none, were in winter "passable no longer; the afflicted districts were shut in by torrents, by snowdrifts, by the spreading of marshes and the swelling of rivers, . . . and there lay the population of Asia Minor locked up

* *Cf.* Hunter's "Annals of Rural Bengal," pp. 48, 49. The Orissa commissioners do not think that there was any supply nearer than in the country north of Agra and in the Punjab (iii., § 18).

† *Cf.* Blair, p. 68.

in the recesses of its fertile valleys, cut off from the rest of the world, with a few bags of seed-corn and starvation to follow." *

ii. The Social Condition of the People.

But if the want of means of communication plays so important a part in the tragedy of a famine, the social condition of the people has its own share. In the East, and more particularly in India, this condition is such as to materially affect the result of a natural scarcity. The physical and moral character of the people; their fatalistic apathy; their divisions of caste; the state of property and of credit among them; the fast increase of their population,—all this, to say nothing of the defective administration of the country, or the prevalence of diseases and of insect plagues, must increase or diminish the amount of actual pressure.

It would readily be supposed that there are great varieties of character among the inhabitants of India. It seems to have been a receptacle for the nations of Central Asia, much as Greece and Italy were for the nations of Northern and Eastern Europe.

* Pamphlet on Famine in Asia Minor, pp. vi., xii., 34.

There are many races of so called aborigines. On these the Hindus descended from the northern frontiers of India, and spread over the country without a general fusion taking place.* The probable cause of their movement south was that they were pressed upon by another tribe, more warlike and of a republican constitution, who are best represented by the Rajputs. This race settled in Northern India, and do not appear to have moved farther towards the south. Many years, probably several centuries, after the Rajputs came the Muhammadan invasions. The Turks from Central Asia, under Muhammad of Ghaznee, invaded India about 1000 A.D., and subdued the whole continent. The second Muhammadan invasion caused the foundation of the Mogul dynasty by Babar in 1526 A.D. Thus there are five races, counting the aborigines as one, each of them probably distinct, already mentioned. The Mahrattas, Jats, and Sikhs are separate tribes, but may be considered as the result of the union of some of these races. To these different influences must now

* It is uncertain when this descent of the Hindus from the northern parts of India took place. *Cf.* Hunter's "Annals of Rural Bengal," p. 96, etc.

be added the European element, introduced by the Portuguese, and enlarged by ourselves.

For our present purpose, however, the inhabitants of India may be divided into two great classes, first, the inhabitants of Northern India, meaning by that term especially those of the Punjab and the North-West Provinces; secondly, the Bengalis and the inhabitants of the coast. The former of these two great divisions are said to be "a robust, hard-headed, strong featured race, absolutely identical with Europeans except in colour."* We need not therefore say much more about them. The Bengalis are, as is well known, entirely different. "A soft, supple, oily-faced, effeminate people," says Sir George Campbell.† Lord Macaulay writes, "The race by whom this rich tract (of Bengal) was peopled, enervated by a soft climate and accustomed to peaceful avocations, bore the same relation to other Asiatics which the Asiatics generally bear to the bold and energetic children of Europe. The Castilians have a proverb that in Valencia the earth is water and the men women; and the description is at least equally applicable to the vast plains of the Lower

* Sir G. Campbell's "Modern India," p. 10. † *Ibid.*, p. 10.

Ganges. Whatever the Bengalee does he does languidly. His favourite pursuits are sedentary. He shrinks from bodily exertion; and, though voluble in disputē and singularly pertinacious in the war of chicane, he seldom engages in a personal conflict, and scarcely ever enlists as a soldier. We doubt whether there be a hundred genuine Bengalees in the whole army of the East Indian Company. There never, perhaps, existed a people so thoroughly fitted by nature and by habit for a foreign yoke."*

The reason of this incapacity is described at some length by Dr. Hunter. He shows how the Aryan race, the Hindus, conquered the inferior race of the aborigines. Instead of uniting with them and thus producing one nation, which should combine the good qualities of both (as resulted in England from the Norman Conquest), the conquerors despised the conquered for their speech, their colour, their carnal appetite, their paganism, and their ignorance of a

* Essay on Lord Clive. Edition of the Essays, 1870, p. 517. *Cf.* his words in his essay on Warren Hastings. "The physical organization of the Bengalee is feeble even to effeminacy. He lives in a constant vapour bath. His pursuits are sedentary, his limbs delicate, his movements languid."—P. 611.

future life. "The great gulf between the conquerors and the conquered has never been bridged." "This contempt has left its mark on every page of Sanskrit literature." But the despised tribes have had their revenge. The pure Sanskrit language has been corrupted. The gentle religion of the Aryan has been defiled with blood. The very character of the Hindus has become corrupted. Had the nations intermingled, it is probable that the one would have improved the other. As it is, the patrician Hindu despised the plebeian aboriginal, and set him to do the work which he himself refused to do. Disliking physical labour, the Hindu is now incapacitated for it. With little energy at first, he has less now. So when the conquerors, whether Afghan, Tartar, or Mogul, descended into the south they ever found a people effeminated by sloth, divided among themselves, and devoid of any spirit of nationality.* The Bengali will never be able to rule until the nations are welded together, until they have common desires, common hopes,—until, the Christian would say, they have realized the equality that is preached

* For the above statements *cf.* Hunter's "Annals of Rural Bengal," chap. iii.

by the Gospel, and the liberty that the inhabitants of England have learnt from the Bible.*

But if there is one thing which tries the patience of the Englishman more than another it is the prevalence of fatalism. If there is famine in a nation impregnated with a Musalmán's views of the sovereignty of God, or with the Hindu's love for

* This seems to be the place in which to deal with the question how far does the vegetable food, on which the natives almost entirely live, affect them. The old assumption was that vegetable food afforded but little nourishment, and it was a wonder that they ever lived at all. But modern investigations show that vegetables and flesh are made of the same constituents. This appears, not only from a chemical analysis of both, but also from considering the fact that, after all, flesh is formed from the vegetables that the animals eat. Vegetarians assert indeed that vegetable food is the more nourishing, and that flesh is like wine, chiefly exciting; and there are, doubtless, instances in which vegetable food alone has made men capable of undergoing great fatigue, and stronger both in body and mind than others round them who have eaten flesh also. The South American miners, the Norwegians, the Finns, may be reckoned as such instances. The writer feels that he is not competent to discuss the question at full length, but has wished merely to call attention to the present opinion of the scientific world with regard to it. (For the authorities of the above statements *vide* Dr. E. Smith's "Foods," pp. 3–5, 143–145, and a paper by Mr. Ninon Kingsford on "The Best Food for Man," in the *Westminster Review* for October, 1874.)

ease, the cry is "It is our fate," "Let me die where I am." The Persian speaks of the famine as "A decree of God, and we must submit. No one can fight against what God ordains."* The *Levant Herald* justly complains of the prevalence of the view with regard to the Asia Minor famine, that it was a visitation of Providence. That might be said of the mortality that had existed among the sheep and the goats, but of the famine—no.† So the Bengalis suffer in silence. Famine is the natural and logical consequence of the loss of the crop. It is the ordinary and legitimate course of things that if the earth yield no food, the people die. The question, who is responsible for the mortality, would never strike the inhabitants of India even at this day except within the narrow circle influenced and instructed by the Anglo-Indian press.‡

If an ordinary Englishman is asked anything about caste in India, he will tell you that there are four distinct castes; that the highest of these is that of the Brahmans; that he does not know much about the other three,, but thinks that the

* Blair, p. 195. † *Cf.* pamphlet, pp. 43, 95.
‡ *Cf.* Dr. Hunter's "Annals of Rural Bengal," p. 35.

lowest are shoemakers. By this he means the fourfold division of the code of Manu, in which the castes enumerated are the Brahmans, the Kshatryas, the Vaisyas, and the Sudras. But even if this stiff classification ever really existed, Manu himself says that he was describing the customs of only "The Middle Land," that is to say the district "from the Himalayas on the north to the Vindhya ranges on the south, and from Allahabad on the east to" the Rajputana desert.* But supposing that it ever existed there, the fourfold division has long disappeared over India as a whole. "There is only one perfect universal caste, that of the Brahmins; there are a certain number of isolated dynasties and communities pretending to belong to the second of the theoretical castes; but, in the enormous majority of instances, caste is only the name for a number of practices which are followed by each one of a multitude of groups of men, whether such a group be ancient and natural, or modern and artificial. As a rule, every tribe, every profession, every guild, every trade, every class is also a caste, and the members of a caste, not only have their own special

* Hunter's "Annals of Rural Bengal," p. 94.

objects of worship, selected from the Hindoo pantheon or adopted into it, but they exclusively eat together and exclusively intermarry."* But it does not seem that there is even this across the Indus. For the accepting caste implied the acceptance of the whole Brahmanical ritual, to which the Rajputs were much opposed.† When caste first took its rise is uncertain. The Rig Veda has very little, if anything, about it; but the Yajur Veda, the second in age, witnesses to the existence of caste, at least in the district where it was written. By the time of the code of Manu, it was fully developed.‡

Caste helps to make the pressure of natural scarcity more heavy in many indirect ways. The higher castes despise the lower, and hold out no right hand to help them. No caste will eat food prepared by another caste, unless the cook should be a Brahman. Besides, to eat other than particular kinds of food is to break one's caste. In all these ways, and in others, such as the want of union that is produced, the system of caste must be con-

* Sir H. S. Maine, "Rede Lecture," p. 19.

† *Cf.* Hunter's "Annals of Rural Bengal," p. 102.

‡ *Cf. ibid.*, p. 101.

demned as contributing its quota to the causes of Indian famines.

Moreover, the feeling of the insecurity of property is a great check to the prosperity of the people. They have not yet recovered from the effects of the rapacity of their former rulers, in which, alas! a previous generation of Englishmen must be included. To obtain wealth was to court danger. Although, happily, such a state of things has passed away, there are not the means of increasing wealth that exist in England. Here we lay up our savings in a bank. There they carry it about as bangles, because there are no trustworthy bankers. Thus their wealth is not invested as capital, so that in time of distress that which they have actually upon them is their only means of procuring food. They can have little credit, for they have little security. How different from an English farmer, who, though his purse run short in a bad year, can obtain credit on the strength of his farm and implements! Government have, however, during the last ten years introduced savings banks, and we may reasonably hope that they will in time have a good effect upon the country.

How many mouths must be fed? For how many people must the soil of India give sustenance? Till the last year or two this question could only be answered by, at the best, a rough guess; not even at present can it be fully answered. There has indeed been a census of British India, and it is with this that we as Englishmen are chiefly concerned; but it did not extend to the four hundred and sixty native states and feudatories.* If these states are removed out of the question we find that, as was stated above,† the population of British India amounts to nearly 194,000,000; while its area is 943,406 square miles.‡ This would bring the average density of the population to rather more than 200 in the square mile.§ This in itself is not too much, but it must be remembered that we must subtract from our calculation those parts of the land which are not cultivated. Unfortunately the statistics of the "cultivated, culturable, and unculturable" lands of British India are not completed, and those for

* For the number 460 see Blue Book for India for 1872–73, p. 158.

† P. 12.

‡ *Cf.* Blue Book for 1872–73: Statistical Table, No. I.

§ That of England is 422.

such important parts as Bengal, Madras, Bombay and Sind, with Mysore and Berar, are not given with the others in the Blue Book for 1872–73.

Judging from the known statistics relative to British India, we may conclude that the population of India as a whole is not as yet too great for the land. It is only in particular districts that doubt arises. Oudh heads the list with an average of 469 to the square mile. Then the North-West Provinces have 378, while Bengal (including Assam) has 269, and Madras 226. Although Oudh and the North-West Provinces are thus found to be the most densely populated, yet it is rather Bengal that has provoked most inquiry. Part of this, especially Chota Nagpur and Assam, is very thinly populated with only 87 and 63 souls to the square mile. But part is one of the most densely populated countries in the world. In Bardwán there are 573, in Patna 553, in Rajshahi 500 souls to the square mile. For the whole of Bengal, in the restricted sense of the word, the number is 430, for Behar, 465; and if the uncultivable or uncultivated lands at the foot of the hills, or waste and marshy lands, are left out, the food-producing area cannot average less than 650 souls

to the square mile, or one for each half-acre, crops being excluded which are not food-producing.* Yet great as is this density of population, Sir R. Temple shows that it is not at present too much for the land. He shows that if one may judge from the agricultural statistics of the only district (Jessore) that is finished, we may say that "lands given up wholly to food crops yield on an average about one ton of clean rice to the acre, that is to say, an acre supplies ample food for four people for a whole year." † Remembering that the density of the population was stated in the Blue Book, as quoted above, to be "one for each half-acre" of food-producing land, that is, two for each acre, we may conclude that the land in the worst parts of Bengal actually cultivated, is capable of supporting twice the number of people that it does at present. The calculation made above, that one acre would feed four persons, is based on the supposition that one acre would produce one ton. Even allowing only half a ton, Sir R. Temple calculates that the cultivated area in Bengal, Behar, and Orissa, which amounts to about 48 millions of

* For this statement *cf.* Blue Book for India, 1872–3, p. 122.

† Minute, p. 53.

acres (75,000 square miles), allowing for deductions for seed, etc., would support 70 millions of people, while the population at present is only 59½ millions.

But, it is said, though the land may be able to bear its population to-day, what will be the case to-morrow? Population in India increases so much faster than it does in Europe, owing to the fact that all the women are married, and that at an early age. In fact, however, it is very difficult to tell the rate of the increase of the people. The previous estimates of the population were found by the census to be erroneous. When therefore we read in books written thirty years ago * that the population of India is 150,000,000, and see that it is now calculated generally at about 300,000,000, we must not necessarily conclude that it has doubled itself in the last thirty years. That it has increased during the peaceful rule of England is pretty certain, but it is impossible to calculate from former experiences, as some have done, what will be the number of the population fifty or a hundred years hence.

* *E.g.*, "Indian Railways," by An Old Postmaster, to which reference will be often made below.

iii. Causes which do not fall under the previous Heads.

It is readily conceivable that foreigners when attempting to govern a state should fail in many things, particularly in understanding those signs of the times that are likely to be known only to the inhabitants of the country. But as they continue in their government, and study the character of the people and the physical peculiarities of the land, they will foresee them more readily. Foreseeing the approach of a famine falls into this category. Thus, although famines have generally come upon the natives without government making any sufficient preparation to meet them,* we may be encouraged by the experience of the last famine to hope that eventually they will be met in proper time.

"It was said in the last war that there was a famine in his kingdom, which swept away two millions of his people." † Fortunately this has not been lately a cause of famines in India. The only one that the writer has seen attributed to war is that of

* *Cf.* especially Orissa famine, Asia Minor famine.

† *Spectator*, No. 180.

1803, when much of the few remaining crops was destroyed by "the incursion of Jeswunt Rao Holkar and of the rebel Nazir Ally Khan, from the march of the army under his excellency the commander-in-chief in pursuit of Holkar." *

Both as a cause and as an effect of famine, sickness and disease must be mentioned. It is said now that the famine-stricken inhabitants of Asia Minor are suffering from famine fever. Similarly it has been noticed in all Indian famines that there is a great increase in the mortality of a district for the next year or two after a famine. Worn out to the last degree, those who have managed to exist till the time of plenty have nevertheless been so weakened as to be able to live but a short time longer. Cholera readily attacks them, and, as in the Rajputana famine of 1868, whilst enfeebled in body by want of food and broken in spirit through misfortune, they fall an easy prey to the attacks of the malady.†

But not yet have we exhausted our list of causes.

* Col. Baird Smith, ii., § 26.

† Blair, p. 76. There is a point in starvation after which ultimate recovery is almost impossible, even though food is supplied and temporary health regained. *Cf.* Sir Bartle Frere, p. 3.

Often as the blade is sprouting comes that terrible oriental plague, the locusts. "Never shall I lose," says Dr. Thomson, "the impression produced by the first sight of them. Their number was astounding; the surface of the mountain was black with them. On they came like a living deluge. We dug trenches and kindled fires, and beat and burned to death 'heaps upon heaps'; but the effort was utterly useless. Wave after wave rolled up the mountain side, and poured over rocks, walls, ditches, and hedges, those behind covering up and bridging over the masses already killed. . . . A large garden and vineyard was green as a meadow in the morning, but long before night it was naked and bare as a new ploughed field or a dusty road."* So it was in the Rajputana famine: they ate up "every green thing in their path, leaving a brown dry track to mark their progress." †

* Description of them in Palestine, quoted in "A Sermon on the Bengal Famine," by Wm. Cunningham, B.A., Trin. Coll.

† Blair, p. 82. The locusts in both these accounts were apparently young, before they had got wings. At the Cape also they are very destructive. They fly on the corn just before harvest, and without eating it, nip it a little below the ear, so that the ear hangs down spoilt.

II.

THE PREVENTION OF FUTURE FAMINES IN INDIA.

"The preventives of famine belong to two distinct classes; those that tend to avert natural scarcity, and those that are directed towards the development of intervening influences between natural scarcity and actual pressure."—DR. HUNTER.*

BEFORE discussing the various measures that have been proposed as means for the prevention of famines in India, it is necessary to consider whether such prevention is possible or not. In other words, are the causes of famines in India of such a kind as not to admit of the prevention of famines? By "prevention of famines in India," we do not mean their prevention when they have come into existence. The possibility of that has been shown by the results of the 1874 famine. For let the native papers complain as they will of the vast expenditure of money (and, be it remembered, it is the natives who have to

* "Annals of Rural Bengal," p. 54.

pay), yet judging from the most trustworthy sources we do not doubt but that Sir R. Temple is mainly right when he says, "My estimate . . . is that . . . upwards of two millions of people must have fallen victims to the famine of 1874 if Government had not interposed on a great and costly scale." * We shall therefore take "prevention of famines" in India to mean the prevention of famines before they come into existence at all.

With regard to prevention, the causes of famines may be divided into positive and negative. The positive causes are those which in themselves directly tend to produce famines. The negative are the want of such means as would counterbalance the positive causes. † Only the positive causes need be considered here, for the negative causes can be removed. They will be met in time notwithstanding the various obstacles presented by soil or situation, if we may judge from what has been done in other countries, or in India itself. ‡ But will not the causes that are of a positive nature make the pre-

* Minute, p. 52.

† *E.g.*, means of communication.

‡ How they can be removed will be shown below.

vention of famines an impossibility? Such causes are the proportion of the population to the soil, the social habits and conditions of the people, and the peculiarities of the climate of India.

That it is possible to meet the first of these, the undue proportion of the population to the soil, no one will deny who has been in England. Here the population is too great for the soil to bear, yet we have no famine. "But," say the objectors, "you have found it difficult enough partially to meet Indian famines with the present amount of population: what will you do if in some eighty years or so there are about 530 millions of persons?" "Hitherto," Mr. Elliot says, "by the length of our purses we have been enabled to overcome those bursts of famine which sweep like tempests over vast tracts of our eastern dominions. But, far above these periodical paroxysms, we have looming in the not very distant future, the picture of vast multitudes of rapidly increasing people, relying on us like children on a father, and toiling patiently for bare subsistence on soils which are year by year becoming more exhausted, and which, under the continuance of existing circumstances, must eventu-

ally be utterly unable to maintain the numbers which threaten to cumber the very ground." * While strongly objecting to Mr. Elliot's simile, "like children on a father" (for of what value is our rule in India if at the end of another eighty years the natives are not able to take some care of themselves?), we acknowledge that he here states the difficulty in clear words. Fortunately he also supplies the answer: "Under the continuance of existing circumstances." If more land can be used, or the soil can be so improved as to provide greater supplies of food, or if the density of the population does not increase so fast as he anticipates, then future famines will be prevented, as far as this cause is concerned.

Again, are the social habits of the people immutable? Take for instance the system of caste. We have already shown that it is very different from the ordinary opinions that exist about it As a fact, caste has often before now shown itself ready to meet the exigencies of the times. Sir Bartle Frere † gives one or two instances, referring

* *Journal of Society of Arts*, for April 9th, 1875, p. 452.

† P. 16, note.

to the use of potatoes and the wearing of certain garments in a particular way. Again, in the Orissa famine, the pundits ruled that "at the critical conjuncture of a widespread famine, it is not considered any sin to eat with a throng of others cooked rice, provided by Government or the community at large," for even holy men have eaten dogs' and even cows' flesh in dire straits.* See too how all caste distinctions vanish in the railway. A man of a high caste takes now no notice of one of a low caste being in the same compartment with him; while it was once believed that the system of caste would prove to be an insuperable objection to the use of railways in India. Moreover, as Christianity spreads, and for Christianity not to spread would be opposed to both history and the promises of God, caste will be less and less of a difficulty, for its very existence will become almost a thing of the past.

Supposing therefore that the difficulties raised by the density of population and the social habits of India can be overcome, what about the third cause? It is this, the peculiarities of the climate, that is the great obstacle. Whether this

* Blair, p. 200.

can be met, experience alone will decide. More will be said on this in the chapter on irrigation. Suffice it to say here that according to past experience, famines would have been prevented if the first two causes had been already met, and if the negative causes no longer existed.

This seems to be the place for discussing the question of there being a scarcity of food over the whole of India. It is certain that since we have possessed India there has been no scarcity extending over the whole land. There are, moreover, but slight traces of such a calamity in any time. Speaking of the famine of 1631, in the reign of Shah Jahan, the historian writes, "disease followed famine, and death ravaged every corner of India;" and it is said that the famine extended over a great part of Asia.* But this is the only case, and in this instance it is not unfair to think that the writer merely meant to say that the famine was very great, without binding him down to assert that it extended over the whole of India. With regard to the possibility or probability of such a scarcity, it seems that there is nothing of which meteorology has as yet told us

* Orissa Report, iii., § 6.

which would make it impossible. But the facts, even if we accept literally the statement about the 1631 famine, are strongly against the probability of such an event. More interesting, perhaps, is the question, what would be the effect on India of such a scarcity? Would the inhabitants die like sheep for want of food, or would they be supplied from elsewhere? Unless Asia was stricken also there seems little doubt but that there could be brought from thence, not indeed at present, but when the negative causes are removed, enough for India. But, to the mind of the writer, the whole prospect of such a calamity is extremely visionary, as visionary as the idea that a complete scarcity will come on the whole world. Meteorology as yet has given us no reason why this should not take place; but we have strong grounds for thinking that it has not done so; we believe that meteorology will in time show why; we trust that when it does, it will say that a scarcity can never fall over the whole length and breadth of India.

Having thus decided that the prevention of famine is *primâ facie* possible, we proceed to discuss what the means of prevention are.

I. MEASURES THAT TEND TO AVERT NATURAL SCARCITY.

i. THE TENURE OF THE LAND.

"First as respects the promotion of agricultural improvement must be placed the tenure of the land."—*Orissa Report*, iii., § 28.

The words quoted above show what was the opinion of the Commissioners for the Orissa Famine with regard to this part of our subject. Both to Government and to people it is of direct importance. To Government, for the land revenue is more than two fifths of its whole income;* to the people, for it is closely connected with every-day life. "The welfare and contentment of the people depend upon the wise adjustment of the demand on the produce of the land: and the difficult questions relating to land revenue have always required the most close and careful attention from Indian statesmen." †

* "The income of 1872–73 amounted to £50,219,489, of which £21,348,669 was derived from land revenue."—*Report for* 1872–73, p. 7.

† Blue Book for 1872–73, p. 15. *Cf.* the words of Colonel Baird Smith:—"To my own mind I confess it appears clear

There seems to be no need why in this essay we should do more than mention the various forms of proprietorship which exist in India. This for two reasons. It would be little more than presumption for a writer to criticize the advantages of the several forms, unless he had made them his special study; and also because experience teaches us that it is better to keep that form of proprietorship to which the people have been accustomed. The proprietors in India at present may be divided into three classes. First, the wealthy proprietor, who may be a táluk-

that no misapprehension can be greater than to suppose that the settlement of the public demand is only lightly, or, as some say, not at all, connected with the occurrence of famines. It lies in reality far nearer to the root of the matter, because of its intimate and vital relation to the every-day life of the people, and to their growth towards prosperity or towards degradation, than any such accessories as canals or roads, or the like, important though these unquestionably are. It is no doubt quite true that not the best settlement system which mortal intellect could devise would cover the skies with clouds, or moisten the earth with rain, when the course of Nature had established a drought. But, given the drought and its consequences, the capacity of the people to resist their destructive influence is in direct proportion,—I would almost say geometrical proportion,—to the perfection of the settlement system under which they are living and growing."—*Report dated August*, 1861, § 36.

dár, one of the "great landed nobility," * as in Oudh; or a zemindar, who may be a large or small landholder, as in Bengal and Orissa.† Secondly, the village community, as in the Punjab. Thirdly, the ryot, or cultivator, as in Madras and Bombay. But while we need not discuss the person with whom the Government makes agreement, the two points which have been mentioned above ‡ as causes of famines must not be omitted.

It is evident that the first of these, the rate of the land tax, will not and ought not to be the same in all countries and times. It will depend on two things: on how far the land tax includes all other taxes that are raised, and on the wealth of each locality. The first cause of variation is doubtless the reason why some land taxes have been at what appears to us an exorbitant rate. Adam Smith considered the tithe,

* "The tálukdárs, or great landed nobility."—*Blue Book for India*, 1872-73, p. 23.

† "Zemindar,—a Persian word, signifying 'landholder,' originally applied to hereditary Hindoo chiefs, afterwards to functionaries appointed by the Mogul emperors to collect revenue, receiving a percentage."—*Mill's* "*India in* 1858," 2nd ed., p. 106.

We have made them proprietors.

‡ Pp. 41-44.

which is but one tenth of the produce, to be a "very great hindrance to improvement;" * yet we find Joseph saying to the people of Egypt, after the famine, that they should give one fifth to Pharaoh. "Behold," he says, "I have bought you this day, and your land, for Pharaoh. Lo, here is seed for you, and ye shall sow the land. And it shall come to pass in the increase, that ye shall give the fifth part unto Pharaoh; and four parts shall be your own, for seed of the field, and for your food, and for them of your household, and for food for your little ones. . . . And Joseph made it a law over the land of Egypt unto this day, that Pharaoh should have the fifth part."† Again, Lord Cornwallis' settlement, which will be referred to more fully below, was formed on the principle of Government taking ten elevenths of the rental.‡ The reason of both these apparently great rates being that those on whom it was levied had hardly any other tax to pay.

That it must vary according to the wealth of the

* *Cf.* Carnegy's "Notes upon the Land Tenures of Upper India," p. 85.

† Gen. xlvii. 23, 24, 26.

‡ Carnegy, p. 85.

locality where the tax is raised, needs but little comment. We pass on to notice rapidly the present rates in India. In the North-Western Provinces the Government share of rent has been reduced from 66⅔ to 50 per cent. Nor has the Government lost by this reduction, for owing to the care with which the assessment was taken, it has been found that there have been reclamations of waste land, improved modes of cultivation, and rises in rent; so that it is no wonder that the net increase of revenue is 13 per cent. on the land revenue assessed.* The immediate effect of a light assessment may be seen in the instance of Gorakhpur, where the number of wells,—a most important means of irrigation in some parts,†—increased by 8792 in twelve years.‡

* Blue Book for India for 1872–73, p. 22.

† *Vide infr.*, p. 102, etc. They are also a great sign of prosperity.

‡ Colonel Baird Smith's Report of Famine of 1861, dated August, 1861, § 121.

Note on the Time of Collection and the Certainty of the Tax.

Adam Smith says that "every tax ought to be levied at the time or in the manner in which it is most likely to be convenient to the contributor to pay it. And again, the tax

Having now discussed the rate of the land tax, we turn to another part of the subject of land tenure,—the question for how long a time ought the settlement of the tax to last. This is a question with regard to which much has been written on both

which each individual is bound to pay ought to be certain and not arbitrary. The time of payment, the manner of payment, the quantity to be paid, ought all to be clear and plain to the contributor, and to every other person." (Quoted in Mill's "Political Economy," Bk. v., Chap. ii., §§ 2, 3.)

The former of these principles is constantly violated in Asia Minor; the latter was often broken in Bengal before Lord Cornwallis' settlement. Cultivators in Asia Minor are called upon to pay taxes when their seed is in the ground, and when the slender resources that they possess are needed for tending and harvesting their crops. The result is that the farmer's crop, be it of grain, or wool, or what not, is as a rule sold for two or three years in advance; he has no earthly hope but that of obtaining his bare bread from the soil, no earthly resource if the soil only once plays him false. (Pamphlet on Asia Minor Famine, pp. xi., xii.) In India, before the settlement of 1793, "the land tax was subject to variation every year, and the proprietors availed themselves of each slight increase as a pretext for enhancing the rents of their tenants. The latter complained that they never knew at sowing time what rent would be exacted at harvest, as the middlemen concealed the fact of an increase until the peasantry were fairly embarked in the cultivation of their fields." (Hunter's "Annals of Rural Bengal," p. 271.)

sides, and with respect to which opinion has undergone considerable changes, even among the same bodies of persons. It will be convenient to divide the matter into two parts. First to give a summary of the lengths of the tenures that exist. Secondly to compare the advantages of the systems. These systems may be said to be three. The annual settlement which is found in Madras; those for a term of years, whether short, as in some parts of Oudh, or for not less than thirty years, as in other parts of Oudh, the North-West Provinces, Orissa, Bombay, and Mysore; and the permanent settlement, which is also in a small part of Oudh,* and especially in "Bengal, Bahar, and Orissa," as Lord Cornwallis' Act calls the area in which it is worked.† This famous act was passed in 1793. When Lord Cornwallis came out as Governor-General of India, in 1786, he found all matters connected with land revenue in a thoroughly disorganized condition. We did not understand what were the proprietary rights to the soil,—

* In 1419 out of 18,261 square miles.

† The Orissa of Lord Cornwallis did not include any part of the present division of that name, but meant the tract between the Rupnarian and Subanrekha rivers, now included in the district of Midnapur. Report for 1872–73, p. 15.

there were probably none in our sense of the term; —and so we tried one or two experiments in the art of obtaining the revenue. We treated the zemindars as proprietors, and expected them to pay us the land tax; but found that they did not understand our system, and did not pay. Lord Cornwallis conceived the idea of making them proprietors, in the English sense of the term, by making a settlement with them for a length of years, if not for ever. He at first proposed a ten years' settlement, but eventually obtained the consent of the directors at home to agree to a permanent settlement. By it the assessment for land revenue in "Bengal, Bahar, and Orissa" was fixed at £2,858,772 for ever.*

In comparing these systems, it will be desirable to take them in the order in which we have mentioned them above. The plan of the annual settlement is that instead of assessing at a fixed sum for a series of years, there is fixed on each field a maximum rent, to be paid when the season and the crop is good. If the crops fail through any cause, Govern-

* For the information contained in the last two pages, compare Blue Book for India, 1872-73, on "Land Revenue," and Sir G. Campbell's "Modern India."

ment undertakes to reduce this maximum according as the crop is worse than usual. At first sight there are no doubt great advantages from this system. It provides both that the ryot be taxed according to his produce, while it encourages industry and economy by the maximum amount of rent being fixed. Thus the savings of the ryot are not touched. But only the first of these benefits is a distinctive feature of this system, the second exists more fully and with other advantages in both the other systems. For whether the settlement be for a length of years or permanent, the result in either case is to increase the prosperity, the private wealth, of the district* by affording increased incentives to improvement and expenditure of capital. Moreover the value of landed property is increased, for the amount of the tax is known to every one who will inquire. Thus there is something to fall back upon in bad times which may, if money be wanting, be used as credit. Instances have been given above† of the importance

* That a long settlement has proved of advantage to the N. W. P. and Bombay may be seen from the Blue Book, 1872-73, pp. 20, 28.

† *Vide* p. 72.

of this, and of the difficulty in which the natives have found themselves from not having sufficient credit. We should therefore say that both the second and third systems are generally superior to the first.

But to choose either of these two, supposing that we were in a position to enforce our views upon the inhabitants of the country, would not be so easy. The advantages of the permanent system were very strongly urged by Col. Baird Smith in his Report on the 1860-61 famine,* and he was followed soon after by Sir William Muir. The Orissa commissioners, on the other hand, were doubtful about introducing it,† and their report seems to have influenced the Government against it.

Among the advantages of the system, may be reckoned the three advantages which were mentioned as belonging also to the second system, only in an intensified form. Among others may be placed the deliverance of the people from the vexations which prevail at every settlement. This was the

* *Vide* Report dated August, 1861, §§ 79–82.

† Report, iii., §§ 28, 29, *vide infr.*

case in Orissa, as has been already noticed.* Also there is the freedom from the tendency to the deterioration of property towards the end of each temporary settlement. Again, there will be a saving of the expense incurred by periodical assessments.†

But there are practical hindrances to introducing the system more widely in India. Although the private wealth of the country will be increased, yet this increase will only be purchased by a direct loss to the public exchequer.‡ Certainly other taxes will partially supply the loss. This is the case in England, where there has been no change in the land tax since the beginning of the last century. But it may well be questioned whether it is wise in the present state of Indian finances to make this change.

There have been proposed two means for overcoming the difficulty. First, that the proprietors should be made to pay higher assets for a permanent than they do for a temporary settlement;§ secondly,

* P. 44.

† *Cf.* Sir William Muir's opinions as given in Blue Book for 1872–73, p. 20.

‡ *Cf.* Orissa Report, iii., § 20.

§ Orissa Report, iii., § 28.

that the basis of the tax should be changed. If it is money, the value of the land may alter, while the amount of money remains the same. It is thought that a better basis is found in corn. It is proposed that so much corn can be given every year, not indeed in grain, but in that amount of money to which it shall be equal, which amount is to be fixed every ten or twenty years, according to the average price of corn during the past seasons. This was recommended by the Orissa commissioners, and has been the view of the Madras Government, and of the late Sir Donald McLeod, Lieut.-Governor of the Punjab.* There seems indeed to be little doubt but that the price of corn, including as it does in a great measure the price of labour, is a better measure of the value of the land than money would be.†

In making a permanent settlement it would be desirable to include, not only the head proprietors or middlemen, but also all those who hold it at various

* Blue Book for 1872–73, p. 21.

† That it is a uniformly correct measure of the value of land, as Sir Donald McLeod seems to imply (*vide* Blue Book, 1872–73, p. 21) may be doubted; *vide* Mill's "Political Economy," Bk. iii., Chap. xv.

subtenures.* We must remember,—it cannot be too much enforced upon us,—that the natives have not been accustomed to look on the soil as belonging to any one individual. They all have rights in it of various kinds.

It is moreover pretty well agreed that no estate be admitted to a permanent settlement of which less than 80 per cent. of the cultivable land is under cultivation; or where canal irrigation will be introduced under twenty years. Or again, if it is in a locality where the standard of rent is below the average.†

We now turn to a remedy of which more has been heard in England, and which is hardly less important,—we mean that of irrigation.

* Orissa Report, iii., § 29.

† Blue Book for 1872-73, p. 20. It is the first of these imitations that is the chief cause of the difference in the length of the land tenures of Oudh. *Vide supr.*, p. 93.

ii. IRRIGATION.

"Irrigation is a necessity for a large section of British India, is of incalculable importance to the cultivators over a still larger area, and is unnecessary only in two limited bands of territory where the rainfall is excessive."—*Blue Book for India*, 1872-73, p. 49.

It has been shown in the first part of this essay that the agriculture of India is seriously impeded by the want of water. The rain, as has been shown, descends for only a short time in the year, and but irregularly during that period. Thus the Government of India have always, and especially of late years, given much consideration to the question, How best may water be supplied? That irrigation of some kind is no idea of modern date may be seen from the book of Deuteronomy, where it is said, "The land whither thou goest in to possess it, is not as the land of Egypt, from whence ye came out, where thou sowedst thy seed, and wateredst it with thy foot, as a garden of herbs."* It is indeed likely enough that the Egyptians used irrigation to a large extent,

* Deut. xi. 10.

if we may judge from the remains of ancient works that still exist.*

There are three means of irrigation,—wells, tanks, and canals. The first of these, that of wells, is found chiefly in Oudh and the North-West Provinces, and also in Orissa, while in Bengal there are none.† Their existence depends on whether slightly below the surface of the land there are to be found water-bearing strata, which form those "unseen reservoirs" for irrigation, as Col. Baird Smith terms them.‡ There are two main differences in wells. They are either *permanent* or *temporary*. The former, the "pucca" wells as they are called by the natives, are usually of masonry, and represent the capital sunk by a village in its agricultural pursuits. The temporary are from their number even more important. They are formed of such materials as happen to be most convenient for the purpose. In Orissa "common wells are made by digging a wide deep hole till the water comes, and then piling short, broad

* *E.g.*, the Lake Moeris, the Bahr Yusuf Canal, *vide infr.*, p. 111, note.

† Referring to Bengal, the Orissa commissioners say, "There are no wells" (iii., § 22).

‡ iii., § 85.

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earthenware pipes on the top of each other in the centre, and filling in the earth around." * Wells also vary much in the forms of machinery used for raising the water. Sometimes may be seen the Persian wheel, with its chain of earthen pots; sometimes the huge leathern bag of uncouth shape and form, drawn to the surface by oxen descending an inclined plane away from the well; sometimes the wooden scoop worked by men from lift to lift till the top is reached; sometimes, as in the Egyptian *shadoof*, the simple earthen pot or light leathern bag, at one end of a long lever, loaded at the other, and alternately raised and lowered by the movements of a man at either side of the fulcrum.†

In the districts where wells are used they have a very important effect on cultivation. "In any moderately populated and healthy part of Oudh," writes Mr. Carnegy, "a well has only to be sunk, and this is no sooner done than cultivators will flock around it as bees encircle the hive." ‡ Comparing it with water from other sources, he adds, "The intrinsic value, if I may so call it, of a well, and more especi-

* Hunter's "Orissa," Statistical Account, p. 18.

† *Cf.* Col. Baird Smith's Report, iii., § 89. ‡ P. 112.

ally of brackish water, over surface water, is keenly appreciated by all practical native agriculturists here; for this reason sugar-cane and garden crops are irrigated where it is possible from wells only, even where the expense of drawing water from a deep well is fourfold that of shovelling it out of a hollow on the earth's surface." * In fact, in those districts where wells are found, they are a more important means of irrigation than either of the other two. For independently of any quality in the water, such as Mr. Carnegy supposes, so much labour is required to draw the water that when it is obtained it is used with great care; "and the limited supply at command is made to do the maximum of useful work." †

But although the value of wells generally can scarcely be overrated, there are of course great variations in the value of any particular well. It may be that the water-bed, instead of being but a few feet, is 60 or 70 feet below the surface,‡ so that

* P. 112. † Col. Baird Smith, iii., § 85.

‡ "The depths range from 20 to 80 feet, and in special localities descend even to 180 and 200."—*Col. Baird Smith*, iii., § 87.

"The depth at which the water is found on the plains being from 10 to 50 feet."—*Blue Book*, 1872-73, p. 59.

raising the water becomes more expensive.* Or, again, the volume of the water varies. Perhaps it is a spring that is tapped; perhaps it is only the ordinary drainage that flows into the well; perhaps the water is raised by a Persian wheel, or it may be by one of the other methods mentioned above. Perhaps the well is three feet in diameter, it may be that it is 30.† The well may be permanent, and irrigate about nine acres of land per annum; or it may be temporary, and be sufficient for not more than three.‡ Each and all these variations found in many combinations of different degrees will preclude the possibility of judging the value of a single well, unless the capabilities of that particular well be thoroughly known.

The second means of irrigation that is extensively used in India is that of tanks or reservoirs. These are either natural, as in the *jheels* of the North-

* Well irrigation is at best an expensive method, for it employs six men and three pair of bullocks every day to keep five acres watered. *Cf. Blue Book*, 1872–73, p. 59.

† Col. Baird Smith, iii., § 90.

‡ *Cf.* Col. Baird Smith, iii., § 91. From Carnegy, p. 113, we should gather that a permanent well generally waters eleven acres per annum.

Western Provinces, which are low tracts of land of variable areas, into which the drainage waters of the country gather, and in ordinary years remain;* or mainly artificial, as the ordinary village tanks of the same provinces, and as the tanks in a great part of the Deccan. "The eastern half of the Bombay Presidency, great part of the Nizam's territory, the ceded districts of Madras, and a great part of the Carnatic," are "emphatically the regions of tanks."† They are formed in various ways, according to the ground. Embankments are thrown across the gorges of valleys, to retain a sufficient volume of water for the land below; the reservoirs are on the descending terraces; long slopes are banked up on three sides.‡ In considering these "tanks," we must leave our English ideas of pools, and take rather such a view as that which is presented to us by Lake Moeris in Egypt, which was in all probability an irrigation work. Thirty-five square miles is not too large a space for a tank to cover, or £11,000 too great a sum

* Col. Baird Smith, iii., § 102.

† Blue Book, 1872-73, p. 70.

‡ *Ibid.*, p. 71.

for its revenue to amount to.* Another rivals nature for its picturesqueness;† a third in its formation submerged five villages.‡

How far, then, are these tanks useful? The *jheels*, says Col. Baird Smith, are often dried up in very hot seasons, and fail to supply with water those lands for whose sake they have been made or improved.§ But even when they fail to water other lands they are not useless, for their own soil generally continues moist enough to produce a rich crop; so that while they cannot be relied upon to save from famine, they may be trusted to provide a partial remedy.

It is, however, the third means of irrigation, that of canals, that may be called irrigation proper. Not, as we have already seen, that the other means are not valuable, for they are sometimes superior to canals, but because canals must be undertaken by Government, not by individuals. Therefore they must not be made at the random choice of one proprietor,

* The Viranum tank. *Blue Book*, p. 71.

† "The Chembrumbaukum tank in Chengalpat looks like a picturesque natural tank."—*Ibid.*

‡ The Ekruk tank. *Ibid.*, p. 72.

§ iii., § 103.

or of a single village; but the whole question about them requires to be thoroughly sifted before Government will undertake them. There are two systems of irrigation canals:* that of Southern India, which may be called the Madras system, and that of Northern India, or the Bengal system.† The difference is caused by the physical peculiarities of the countries. In Southern India there is much deltaic land. The rivers have brought down from the Ghâts large quantities of silt, so that they have gradually formed the land between the Ghâts and the sea.‡ It was shown in the first part of this essay§ how flat in consequence the land is, and how easily in the rainy season the rivers overflow their banks and flood the country. Yet in summer time, the vast rivers pour

* Canals as means of communication, and how far navigation can be joined with irrigation in canals, will be considered below, under the head of "Means of Communication."

† *Vide* Spon's Dictionary of Engineering: Art. "Irrigation."

‡ How fast this formation is still going on may be gathered from Dr. Hunter's account of the Chilka Lake in Orissa. He says, "I find from old documents, that a century ago, the neck of land was only half a mile to a mile broad, in places where it is now two."—*Orissa*, vol. i., p. 24. This is a neck of land separating the Chilka from the sea.

§ Pp. 25-28.

down their wealth into the ocean, while the land around is parched for thirst. To prevent this waste of water, by applying it to agricultural purposes, canals have been formed. The method used is to dam up the stream when it has run a considerable way across the deltaic land, by forming a large embankment, or *anicut*, as it is called. Thus the waters are partially stopped, and made to run into canals. These owing to the flatness of the whole country are made to run with but a slight incline over large districts.

But in Northern India the physical nature of the country is entirely different. There may be some flat deltaic land close to the bed of the river, but beyond it there is high, even hilly, ground. How then can this high land be reached? Not by the former method, for then the canals would run merely along the silt which is always sufficiently well watered. It is necessary to go back to a point high up in the river's course, whence the water can be brought to the high land by excavation of a moderate depth, and by which sufficient command of level may be obtained to overflow the surface.*

* Dictionary of Engineering, as quoted above.

CANALS IN NORTHERN INDIA.

There are two kinds of canals in Northern India,—inundation canals, and canals of permanent supply. The former of these are only filled when the river is above its usual height. With the commencement of summer the snows on the Himalayas begin to melt, and to fill the streams, of which the overflow runs into the canals. By their means, the country, which would be otherwise brown and parched, is kept wet and green; though the sun be scorching, the leaves of the trees fail not, because they are by rivers of waters.*

The perennial canals are far more troublesome and expensive. To have a continual stream flowing through them, and to take it to the higher lands, the head of the canal must be made close to where the river comes down from the mountains. Mountain

* "During the winter the water of the rivers is not sufficiently high to enter the canals, . . . but as the rivers rise in the spring from the melting of the Himalayan snows, the water gradually enters the channels, which obtain their maximum volume in summer; so that when water is most needed, when the sky is brass and the earth iron, the inundation canals from April to October produce luxuriant crops. The corn before yielding its grain is twice mown down as fodder for cattle, and then ears, and produces abundant harvests."—*Blue Book*, 1872-73, p. 50.

torrents may have to be crossed, hills cut through, even aqueducts made, if the wild wastes of the tableland are to receive new life.

Such are the various sorts of irrigation canals in India, and their respective objects. We now have to consider more fully the subject of irrigation by their means.

That they were well known to the former inhabitants of India is clear from the existing remains of old canal works. An irrigation system existed in some considerable vigour during three or four centuries of the Muhammadan rule,* but not only through their influence, if we may judge from the fact that canal works are found nowhere more vast than in Tanjor, whither they hardly descended.† In the Indus basin the native rulers of the Afghan tribes made large irrigation works. Round Multan, and in the high districts of the Bari Doab above Multan, the canals still remain; and the old works in Bhawalpur may be traced by the ruins of cities and villages upon their since neglected banks.‡

* *Cf.* Col. Baird Smith's Report, iii., § 147.

† They did go as far as that, but these works were made long before their time. *Vide infr.*, p. 112.

‡ Blue Book, 1872-73, pp. 50, 51.

The opportunities for irrigation in Sind were not passed over. "Traces of ancient channels are to be met with in every direction."* Similarly in the Ganges basin, care was taken to provide the Doabs† with at least a partial supply, besides the well irrigation which was in full force. So early as 1351 the Emperor Firuz Shah made a private canal from the Jumna, to water his hunting ground; but there are no marks of irrigation works along the line of the canal. In 1626 a branch was cut from it to water the city of Delhi.‡ Near Meërut, Muhammad Aboo Khan seems to have made an attempt at irrigation, although, if we may judge from Col. Cautley's remarks, it seems to have done more harm than good, for it was made only by a valley being flooded so as to form a lake, and the embankment by which it was formed must have been destroyed by every annual rainflood.‖

* Blue Book, 1872–73, p. 55.

† "Doab," literally = "two waters," and means the land between two streams.

‡ Blue Book, 1872–73, p. 60.

§ Report on the Ganges Canal Works, Vol. i., pp. 6, 7.

‖ As an instance of an early canal irrigation made in Egypt, may be given the Bahr Yusuf,—Joseph's River; a series of

We mentioned above the great native irrigation works in Tanjor. "At the head of the island of Seringham, near Trichinapalli, the main river divides into two branches: the southern retaining the name of Kaveri, and the northern being called the Kalerun; which latter has a larger volume, a more rapid slope, and a more direct channel, and the tendency was for the smaller stream gradually to silt up, and the whole volume to pour into the Kalerun. This would have ruined the irrigation of Tanjor. The ancient native work, called the Grand Anicut, was a solid mass of rough stone 1080 feet long, and 40 broad, stretching across the bed of the Kaveri in a serpentine form, at the lower extremity

canals on the west side of the Nile, of about 120 miles in length. *Vide* Smith's Dict. of Bible, i., p. 498; and Russell's "Egypt, Ancient and Modern." Mr. Russell adds, "In no circumstance, indeed, do the arts and civilization of ancient Egypt appear more manifest than in the care which was taken to improve the productive qualities of the soil by means of irrigation. A slight inspection of the plain of Fayoum [which the Bahr Yusuf waters] even in its present neglected state affords the most convincing proof that, in the days of the Pharaohs, no degree of labour was accounted too great, provided it could secure to the agriculturist a share in the blessing annually communicated by the Nile." (p. 77.)

of Seringham Island. It was built upwards of 1600 years ago." *

While, however, we have not originated in India the idea of canal works, we have revived and greatly extended their use. To enumerate the various projects that have been carried out, begun, or proposed, would be somewhat wearisome. In the Indus, in the Ganges, in the Mahanadi, in the Madras water system, schemes have been carried out; but only partially. Every page of the Blue Book describing the irrigation works says that this scheme has been abandoned for a time, or that scheme hardly begun. In one case the natural obstacles proved greater than had been anticipated; in another, the river from which the water was to be taken turned out not to be of so great a volume as had been calculated. Sometimes the silt keeps filling up the works; sometimes there has been an erosion in the bed caused by too great a slope.†

To turn to the practical question—Does experience

* Blue Book, 1872–73, p. 69.

† Full particulars of the various schemes will be found in the Blue Book for 1872–73, pp. 49–74.

show us that advantage is derived from irrigation canals? Have they been of any use in the prevention of famines? There is but one answer. As an instance, since the Bigari Canal in Sind was enlarged, in 1854, so that its capacity was about doubled, villages have sprung up where people dared not take their flocks because of the plunderers who infested the desert on its banks; where the canals go "the desert is converted into a garden, and woods take the place of sand."* In the Ganges basin, Col. Baird Smith shows how the famine of 1861 was resisted wherever there was irrigation. While, as has been said, he considers one cause of the difference of the tracts in the famine district to have been the character of the inhabitants, he attributes the other to the presence or absence of irrigation. He expressly attributes the absence of any suffering in some districts to the fact that they were the "sections which are profusely intersected by the distribution channels of the Ganges Canal, from which about 100,000 acres are reported to have been watered during the period of drought." † In the

* Blue Book, 1872–73, p. 57.

† ii., § 11, *Cf.* also his map of the intensities of the famine in

last famine also, canal works saved nearly 160,000 acres, and preserved about 70,000 tons of food.* In Orissa they have not been unavailing, for it is stated on trustworthy authority, that "the limits of the famine in Orissa were bounded by the limits of irrigation."† Similarly, since the irrigation works on the Kaveri were improved in 1830, "there has not only been no famine in the delta [of Tanjor], but it has constantly supplied neighbouring districts in times of scarcity."‡

Thus far we have treated only of the advantages of irrigation. It cannot, however, be denied that there are evils connected with it, that is to say with canal irrigation works. So great indeed are

the different districts, with that of the areas protected by canal irrigation works.

* "As regards Behar, irrigation from the unfinished channels of the Sone Canal had saved the rice and spring crops on 159,500 acres in the districts of Shahabad, Gya, and Patna."—*Sir R. Temple Rep.*, p. 11. "The amount of food thus secured to the country is reckoned by the Irrigation Department to have been 70,000 tons, valued at £580,000 sterling."—*Ibid.*, p. 57, note.

† Mr. Fitzgerald. *Vide Society of Arts Journal*, for April 9th, 1875.

‡ Quoted by Sir Bartle Frere, p. 87.

these evils that irrigation has been termed a curse instead of a blessing, and the natives have remarked, "You are killing us with your irrigation."*

The evils of irrigation are twofold,—"mechanical" and "chemical." The mechanical evils result from an ignorant application of the water to the soil. If when the wheat is young so great a quantity of water is turned over the field as to make the surface into mud, and if this be repeated as often as the land gapes with the heat, it is a natural consequence that the soil after harvest becomes a dense mass with little power of absorbing or radiating heat. More difficult to be ploughed, the land will be ploughed less deep, the soil therefore becomes less absorptive, and floods will be caused. And this has actually happened again and again in Northern India.

But the chemical evils are still more disastrous. Below the surface of some lands there exist soda salts in the soil, so that the spring water is distinctly brackish. If water is applied to the surface

* *Cf.* Mr. Elliot's paper before the Society of Arts, as published in their journal for April 9th, 1875. Much of this part of the subject has been gathered thence.

and no drainage provided, the salts rise in the course of time to the surface. An efflorescence, called *reh*, is produced, which destroys all vegetation. It were well if it stopped there, but it makes the whole neighbourhood unhealthy to cattle and men.* In 1858 fifty-nine villages were said to have been injured by this means, and Mr. Elliot gives a frightful picture of the state of the people in those districts.

But it by no means follows from this that irrigation as a whole is not praiseworthy. For in the first place the soda salts are in only some parts of India;† and even if they were in all, their presence might be overcome. How is it that they did no harm before the introduction of canal irrigation? That which has been said about the mechanical evils will give the answer. The water from the canal works has been in many cases simply poured upon the soil without any means having been used to carry it off, or without any

* *Cf.* Blue Book, 1872–73, p. 128.

† What parts is not known. This is one of the subjects on which statistical information is so much needed, *vide infr.*, p. 131.

consideration as to the quantity of water that the land actually required. Irrigation without drainage is an absurdity. It may indeed be *natural* if the subsoil be porous, but if not it must be *artificial.* And let not any one think that drainage is all very well for a cool but bad for a hot season. In the English drought of 1868, those lands that were drained deeply stood the heat better than others. The reason is that by deep soil drainage and deep ploughing more tilth is made, and thus there is more space to hold water and fertilizing matter.*

But as there is a danger that if large quantities of water are allowed to run through the land and be carried away by drainage they may carry with them some of the best constituent portions of the land itself, there is yet a better way of avoiding the evils of irrigation. It is a method which is in use at the Cape,† where water is exceedingly scarce, so that there is a great difference between the value

* *Cf.* a letter by Mr. Shrinath Datta in *Times* of March 30th, 1875.

† The writer has used here both Mr. Elliot's paper and also private information given to him by a friend who has resided at the Cape.

of a farm dependent only on rain and that of one which is situated on a river's bank.

A trench, called a "furrow," is cut from the stream, by which the water is conducted either directly to the land which requires water or to a reservoir. From the "furrow" or reservoir a "plough-furrow"* is made to take the water along the top of the field. At right angles to this, down the slope of the ground, run the "akers" (*Scotice "riggs"*) of land, already marked out by plough-furrows. When water is wanted (and it is generally wanted before ploughing, soon after the blade comes up, and repeatedly during the summer), the farmer lets a small flow into the plough-furrows, and turning it over about twenty yards at a time spreads it over the land, directing its course by spadefuls of earth thrown here and there. By this means no water is wasted, no drainage required, and therefore it is impossible that noxious salts could rise to the surface to cause the chemical evils, or the land could be so thoroughly soaked as to cause the mechanical injuries.

* So called because it is made by the plough being drawn once along.

Those, however, who are opposed to the use of canals for irrigation assert that the inhabitants frequently refuse to use them. This has been the case in Orissa and on the banks of the Ganges Canal. The reason in the latter case may most fairly be attributed to their fear of efflorescence, mixed perhaps with a little suspicious dread of anything new and of anything that might increase their taxes if they used it.*

Why it is not used in Orissa is not so clear. Possibly efflorescence is not unknown there, or perhaps, as Sir Arthur Cotton suggests,† they are of too low a type to understand the advantages which might be derived from it, especially as the zemindars, who are said to have encouraged them

* Mr. Peterson says that "he had, however, seen men hoisting water by the bullocks in many cases 120 feet, and flooding their land with this while there was the canal water which they would not take." *Society of Arts Journal*, April 9th, 1875. Though the natives were wrong in theory in doing this, for canal water would not in itself be more injurious than well water, they were right in practice, for they would not use enough well water to spoil the land or raise the efflorescence, because of the trouble which they were obliged to take to get it.

† *Cf.* Sir Bartle Frere, p. 92.

not to use the water, wish to keep them in as low a condition as possible. Be it as it may, considering that canal works are originally a native idea, and remembering the immense number of acres that are annually watered by their means, we believe that this reluctance of the natives to use the water in the right way will not be of long duration.

Concluding therefore that canals are desirable for irrigation purposes, and that more are needed if India is to be preserved from famine, the pecuniary question next claims our attention. That the expenses must be great is evident, more particularly as even after the canals are made they are in continual need of repair. Is any profit to be derived from the canals? What returns have they already made, and what may we reasonably expect that they will make?

We may at once acknowledge that the direct returns are not great, especially at first. "In no case, even the most favourable, can it be expected that the income realized will pay immediately interest on the capital spent. In every case there must be a period of growth, during which charges for interest and

capital will accumulate against the work."* The Ganges Canal was twelve years before it paid as much as 4 per cent., although now it pays about 12 per cent.† The whole series of canals in the North-Western Provinces give only a profit of 3·46 per cent. on the capital.‡

But after all we must not look at merely the direct returns of irrigation works to see their value, but must consider also the indirect returns. Irrigation is closely bound up with the land revenue. Where there are canals, the land is so improved that the land tax is raised. If this increase of revenue be added to the profits, it may be said that the Western Jamna Canal gave in 1872–73 an interest of 31 per cent.,§ while the profit of the whole system of canals in the North-West Provinces is raised from 3·46 to 5·3 per cent.‖ "But even if through any circumstance a work does not return net 5 per cent. to Government, but at the same time benefits the people to the

* Quoted in Blair, p. 215, from "an official document of late date."

† *Ibid.*

‡ Blue Book for 1872–73, p. 65.

§ *Ibid.*, p. 61.

‖ *Ibid.*, p. 65.

extent of 20 or 30 per cent., it is really an immense benefit to the country, and even to the Treasury, because it is impossible to enrich the people without all the different items of the revenue increasing."*

There appears to be some doubt as to the best method of taxing the cultivators for the use of the water. The present method in the Bari Doab is to have different rates for different crops, according to the volume of water required by each crop. Thus for sugar-canes the charge is 6 rupees; for rice and gardens, Rs. 4·12; for wheat, barley, cotton, and indigo, Rs. 2·8; and for other cereals and pulses, Rs. 1·8 per acre.† Elsewhere the rule is to charge a permanent tax on the lands. Colonel Baird Smith hoped by this method to induce the people to use the water.‡ Lord Mayo and Sir John Strachey have also advocated this method. Dr. Hunter gives the true limit to it when he approves of it in cases where "the cultivator's net profits will be increased by the canal after paying irrigation rates." §

* Sir A. Cotton. (Sir Bartle Frere, p. 88.)

† Blue Book, 1872–73, p. 54.

‡ iii., 76. He succeeded also. *Cf.* the note on the same page.

§ "Orissa," ii., p. 198.

While showing the advantages and disadvantages of irrigation, and the expenses connected with it, we have not said what the Government ought to do with regard to undertaking fresh works. Ought it to undertake them when there seems to be no unusual obstacles in the land itself? Or ought it to refrain from undertaking them on the ground that they are unprofitable? "Protective works," says Dr. Hunter, "on a great scale are admitted to be absolutely necessary to save the people from famine; and until they are granted, Government goes in daily peril of being called to witness the extermination of its subjects." * Yet after they have been constructed, it may be found that there are evils connected with their use previously unthought of; that the people will use them only in a slight degree; and that the cost of them falls upon the Government, which is at all times ill able to bear its current expenses. In Dr. Hunter's opinion, "the general problem of how to protect the Indian husbandmen from famine without overwhelming the Indian exchequer still remains unsolved." † Therefore, considering the many

* "Orissa," ii., p. 196.

† *Ibid.*, p. 199.

difficulties connected with the subject, we need not wonder that Lord Salisbury said at Manchester, in the beginning of the year,* "Although it is our intention to pursue a policy of irrigation where we see good cause for it, and where we have thoroughly reliable grounds for hoping for a return, undoubtedly we shall pursue it with more jealousy and more frugality than was our inclination some years ago."

Meantime, until this problem is solved, it were well if Government would encourage small irrigation works more than it does. In many cases a proprietor would make small canal works, like those that farmers make at the Cape, if he did not fear that his land tax would be raised. If a cultivator improves his land by irrigating it at his own expense it seems to be just and advantageous in the present condition of India that he should not pay more for the improvements that he himself has made.

In speaking of irrigation, we must remember that it is to be seen in full force much nearer than India. In Italy, France, and Spain the system is constantly used.

* Jan. 23rd, 1875.

Mr. Moncrieff was sent in 1868 by the Indian Government to report on the irrigation in those countries. He seems, on the whole, to have been satisfied that Indian irrigation works were equal in engineering, but inferior in the use that the cultivators made of them. The difficulties of European were as nothing compared with those of Indian irrigation. Comparing Southern France with India, he says: "In India we have to deal with all the powers of Nature on a far larger scale,—heavy rains and great bodies of water loaded with silt. The materials we have to oppose to these forces, too, are far from satisfactory,—no stone, little cement of hydraulic properties, a soft soil, that admits of rapid scour the moment the water's velocity is the least too great, and that affords a bad and difficult foundation for buildings. . . . But here how different! . . . Yet if our difficulties in India are greater, and if we have to fight long years against a trying climate, and far from home, we may feel surely that the honour to be won is the more. Doubtless South France has reaped many benefits from irrigation, but it is not there a matter of life and death as with our Indian fellow-subjects, and while the French canal engineer

may think with satisfaction that his labours will provide provender for all the cattle of the district in seasons of drought, he cannot, like us, feel the honour of helping directly to save hundreds of thousands of men and women from the worst horrors of starvation."*

iii. Other Means to Improve Agriculture.

"Agriculture is the main resource on which India relies for the supply of her wants; and the branch of administration dealing with it is the most important that can occupy official attention."—*Mr. Clements R. Markham.*†

We have now described at some length the subjects of land tenure and irrigation as important means of the prevention of natural scarcity. There are some other means which must now be noticed

* "Irrigation in Southern Europe," pp. 80, 81.

Connected with this subject of irrigation is that of resisting the floods. To maintain embankments against these is an important duty of the Government in Lower Bengal. Similarly on the banks of the Irawadi they are being made. In Orissa the inhabitants have long used them, though with only partial success.

† In a paper read before the Society of Arts, on May 19th, 1875.

as having greater or less influence upon the state of agriculture. These are direct measures that have been proposed to meet the deterioration of the land; better statistics; the education of the agricultural classes; and more opportunities for the introduction of improved kinds of food.

It was shown above* that the great want in all Indian agriculture is manure. If it is so scarce that only the best lands can be treated with it, and that but sparingly, it is evident that the land of India must be undergoing a gradual deterioration. This too as the population is increasing. How may the proper quantity of manure be supplied? What measures have been suggested for the removal of this great hindrance to the welfare of India? The supply of manure at any given place in England generally depends on whether the place be near a town. If it is, the probability is that it will have little difficulty in obtaining as much as is required. Any one who has travelled much in the suburban railways, especially towards Richmond, must have noticed the extraordinary way in which vegetables are grown. Asparagus beds are invariably planted

* Pp. 52–54.

for part of the year with some kind of cabbage, while between every row of gooseberry or currant bushes grow lines of onions. Far from London this would be impossible.* The asparagus would dwindle down to the size of a straw, the gooseberries be not worth eating. Owing, however, to the abundant supplies of manure that can readily be procured, the land is kept in such a high state of cultivation as to bear the best possible fruit. The possibility of obtaining manure, therefore, depends much on means of communication.†

But as it is probable that even if the means of communication were perfected, the supply of manure from the towns would be insufficient for the whole of India, it is necessary to find some other method. Vegetation must be increased, and this in two ways: by the preservation of pasture land and the planting of trees. It has been the tendency of man in all ages to gradually break up the pasture land for cultivation as soon as ever he finds himself the least straitened for want of food. Though this is of

* Except of course in the vicinity of a large town.

† *Vide infr.*, p. 137, for a full discussion on the subject of means of communication in India.

course a natural principle in human life, yet it has often been carried too far. They forget that if they themselves are to live, their cattle must live also; and that the beasts are valuable, not only for the work which may be got out of them, but also for the manure which they produce. But how can the manure of ill-fed cattle be useful? By taking away pasture land more land indeed is given to the plough, and possibly for a year or two more food will be obtained; but after that time the resources are gone; that which gave the rich manure to fill he exhausted field * has been taken away; the land must continue to give an amount of food that decreases year by year.

Not only, however, must the grazing land for each village be kept intact, but also trees must be planted: for with no leaves for the cattle to lie on much of the manure is wasted. Moreover, leaf manure itself is exceedingly good for the texture of the soil. Sir George Campbell says that when he was in the Punjab, as a young man, he made a law that every man in his district who cut down a tree should

* "Arida tantum
Ne saturare fimo pingui pudeat sola."—*Virg. Georgics*, i., 80.

plant five in its place;* and although this law may seem nowadays rather arbitrary, and as Sir G. Campbell himself says, "could hardly be enforced now," it may be doubted whether such a despotic act as this would not be warranted by the present state of Indian agriculture. The natives would respect us none the less for being despotic in a good cause. They are accustomed to be ruled with a strong hand, and there is much fear that now we are apt to be too much led by the outcries of the half European and but half civilized writers of the young Indian school.

It will have been noticed how often in this essay the absence of trustworthy statistics has been alluded to. It is not mere Aristotelian philosophy, but also actual experience, that teaches us to collect facts if we would understand the science of government. The bases of statistics are three:† space, which is the abstract of all relations of co-existence; number,

* *Vide* Sir G. Campbell's speech at the Society of Arts, in their journal for Jan. 29th, 1875, p. 190. *Cf.* also Mr. Elliot's paper in the same journal for April 9th, 1875, who strongly advocates such an act being passed.

† The writer gladly acknowledges how much he is indebted to the paper by Mr. Clements R. Markham, already referred

which is the abstract of all relations of comparison; and time, which is the abstract of all relations of sequence. Under the first head the area of the lands, etc.; under the second the amount of food that they produce, the number of the population and their materials; under the third will be found a statement of the changes that have occurred in the course of years. This last is derived from a comparison of past statistics. Statistics should be taken of everything connected with agriculture, whether directly, as of the lands and their produce, etc.; or indirectly, as of irrigation, forests, and trees, and communications and facilities for transportation.

The object of the statistics will be that the right assessment may be made—how important this is has been shown in the first part,*—that the right lines may be chosen for irrigation canals, that the methods of Indian agriculture may be fully made known, and that questions of social science, such as the relation of the number of crimes to the poverty of the dis-

to, for help in this subject. He thought of merely referring the reader to that essay, but considered that it would be more convenient to put down here some of the lessons which he learnt from it.

* Pp. 41–43. *Cf.* pp. 89, 90.

trict, may be decided by means of an accurate knowledge of the condition of the people.

There has indeed been something done towards obtaining these statistics. "Much care and attention," says the Blue Book for 1872-73, "have been bestowed upon the form in which such statistics should be compiled in the Bombay presidency."* The same system has been recently begun in Mysore. In the Madras presidency also there are complete statistical records from 1810 to 1825, and there is still a quinquennial agricultural census. In the North-Western Provinces and in the Punjab statistics have been made at the time of the various settlements, and the reports of parts leave nothing to be desired.

Generally speaking, however, the statistics even when collected have not been made in such a form as readily to be comprehended; more is wanted than a series of tabulated figures. There should be maps and diagrams, with a commentary. Such have been published in France and Holland, and one or two in India.†

* P. 34.

† Mr. Markham does not mention Dr. Hunter's statistical

Although we opposed the idea that the art of Indian culture was so little understood by the natives of India that it could be taught them by Englishmen, it must not be supposed that we thought that the natives had a perfect knowledge of it. No doubt much of their skill is empirical rather than scientific. We may reasonably hope that they will yet understand the art more thoroughly, and, when the agricultural classes are better educated, do their work more intelligently. It is not the writer's intention to describe any scheme for improving the education of these classes. One will be found in Sir Bartle Frere's book. He desires only to point out that the establishment of schools for agriculture or the teaching in common schools of some of the fundamental principles of farming would be advantageous.

With regard indeed to the establishment of agricultural schools or colleges, it is difficult to find any one capable of teaching in them. Sir George Campbell failed to get instructors for his agricultural

account of Orissa in his book on that province. It seems to the writer nearly to answer to the above requisites, with the exception that there are no maps or diagrams.

lectures at Calcutta. Men knew either the theory or the practice, not both. Another and perhaps better method of encouraging a scientific knowledge would be by giving rewards to those agriculturists who were specially successful in farming by scientific principles.

It is also the duty of the department of agriculture * to introduce to the knowledge of the people such new kinds of grain or seed as may serve to improve the food grown in the country. This no doubt will be much fostered by the spread of means of communications which will enable the people to go about and see for themselves. But the establishment of model farms, which should be self-paying, and gardens would be a great help. Similarly the establishment of museums, containing, like our South Kensington Museum, specimens of all kinds of food grown in the country would be useful.

Whilst on this subject we cannot help noticing with pleasure the movement that has sprung up lately to make in England an Indian Museum, or museums. Nothing has been done of late years that

* There is no department for agriculture *alone*. Lord Mayo made one for Revenue, Agriculture, and Commerce.

will have a more important influence on India than this. For the first time it will be possible in England to see the various productions and articles of Indian commerce arranged in due order. The cotton manufacturer will be able to see the various sorts of cotton that India grows, and the materials that each sort can make; the agriculturist to learn the natures and varieties of the foods. If it only made the very existence of India more realised by the English it would not be useless; as it is, every one who takes an interest in India will be instructed by it.*

* It is much to be hoped that a museum of this kind will be formed, not only in London, but also in all the more important commercial towns of Great Britain.

2. MEASURES WHICH ARE DIRECTED TOWARDS THE DEVELOPMENT OF INTERVENING INFLUENCES BETWEEN NATURAL SCARCITY AND ACTUAL PRESSURE.

i. MEANS OF COMMUNICATION.

"There be three things," says Lord Bacon, "which make a nation great and prosperous; a fertile soil, busy workshops, and easy conveyance for men and commodities from one place to another." *

Amongst the intervening influences between natural scarcity and actual pressure, which, as Dr. Hunter says, may be summed up by the two words "modern civilization," there is not one so important as that of a system of communication.

The effect of means of communication in bringing food to an otherwise impoverished land has already been shown from the example of England.† We also pointed out that in every previous Indian famine there has been at no great distance supplies of food capable of satisfying the needs of the afflicted dis-

* Quoted in "Indian Railways and their probable Results," by an Old Indian Postmaster. 3rd edition, 1848, p. 26.

† P. 58.

tricts.* We also mentioned their use in improving the state of agriculture by supplying manure, or in causing the farmers to be acquainted with better kinds of seed.† We turn now to discuss the several means of communications in India.

About forty years ago the system of communications in India was chiefly noticeable by its absence. With the exception of a few parts, such as Lower Bengal, where water carriage could be obtained, the only modes of travelling were to ride on horseback or to be carried in a palanquin. The half-beaten tracks went along through forest and field, by the side of valleys and over hills, here skirting a swamp, there meeting an unbridged stream, while the traveller congratulated himself that the stoppage was caused only by natural obstacles, and not by robbers. To be sure there was the bullock-cart to carry your baggage in the better parts of the track, but your bones were indeed to be pitied if you jolted along in that. The time taken depended on circumstances. If you happened to be travelling rather late in the season, and an untimely shower should come down

* P. 61.

† Pp. 128, 135.

before the expected date, you might find the nullah which was yesterday but a bubbling brook, to-day a fierce torrent, tumbling over the rocks. You could only wait, or run the chance of drowning your horse or servants, or at least leaving your baggage behind.

The present means of communication are three: water, road, and rail. Communication by water is confined chiefly to canals. Of course the rivers are used where possible, but the depth of the rivers varies so much at different seasons of the year, that many of them cannot be reckoned upon. Moreover, they are generally mountain streams, and therefore in many places navigation is prevented by rocks. Such is the case with even the Godávari. In the last 300 miles of its course there are three rocky barriers, of thirty-five, fourteen, and twenty miles long. It is the more to be pitied, because if the river was navigable it would be able to bring down large supplies of corn from the central provinces.*

Canals will always be necessary, however many

* There has been a great scheme for making it navigable. The scheme was proposed in 1851 by Sir Arthur Cotton; but although about £800,000 had been spent, the project was finally abandoned in 1871.—*Cf. Blue Book for* 1872-3, p. 79.

roads and railways there may be, for carriage by water is considerably cheaper than by any other method.* Even in England we could not dispense with some of our great canals.† Canals are found chiefly in Bengal, and although new roads have been undertaken, the traffic on canals is still increasing.‡ It seems at first sight, that the canals which are made for irrigation purposes would serve also as means of communication. A minute's thought will make it plain, that it is not necessarily the case. In the first place, irrigation canals avoid towns, both because it is the country that requires them, and because the water would probably be injured by going through a town. Navigation, on the contrary, goes towards towns.§ Besides in the hot weather, the canal water is needed for irrigation, and the depth of the water would in a dry season, and especially at the end of the canal, probably become too low to admit of

* Carriage by canals is said to be threepence per ton less than cart hire.

† There are 2800 miles of canals in England. Their prosperity was checked for a time by the formation of railways, but is now greatly revived, and railways are connected with them. *Cf.* Haydn's Dict. of Dates, 14th edit.

‡ Blue Book for 1872–73, pp. 77, 78.

§ *Vide* Blair, p. 218.

navigation.* Although therefore it would in many cases be quite possible to make irrigation canals also means of transit, the expense of obtaining the extra supply of water would counterbalance the advantage.† In accordance with this view, the Government of India, while "quite sensible of the advantages in many cases of combining navigation with irrigation," and allowing that "the consideration of the subject should never be omitted in preparing and submitting irrigation projects," yet add, that "economy in the consideration of irrigation canals is an object of such paramount importance, that all other considerations must give way to it; and in this view, navigation can only be afforded when there is an assured prospect of a return for the outlay, or when the extra expense of supplying facilities for navigation is comparatively small."‡

But canals could not be made in the greater part of India, while roads may be made anywhere. The

* *Vide* Col. Baird Smith's Report, iii., § 173.

† Of course, irrigation canals when full, can be used for transport, *e.g.* the Soane Canal was used in the famine of 1874.

‡ A resolution passed by the Indian Government putting off Col. Rundall's Scheme for Irrigation. Quoted by the *Times* correspondent in the issue for January 11th, 1875.

Romans knew the value of roads. Every part of the empire was, as it were, joined together: through Italy and Dalmatia; through Spain and France, through German forests, and the wilds of Britain, their straight lines ran.* The apricot and the peach, the vine and the olive, flax and lucerne, were brought from the east to the west; moreover, "accidental scarcity, in any single province, was immediately relieved by the plenty of its more fortunate neighbours."† So of India it has been said, that "no road has ever been constructed without an immediate and almost magical effect."‡

Much has been already done. Great roads now run through nearly every part of India, and they have been found effectual in equalizing prices, and warding off local distress.§ Some of them, as the Grand Trunk Road up the Ganges Valley, have been superseded by railways; others will probably long re-

* There is a convenient little map of the chief Roman roads in Seebohm's, "The Era of the Protestant Revolution."

† *Cf.* Gibbon (Bohn's Edition), vol. i., pp. 67–71.

‡ Quoted in "Indian Railways," preface, p. xliv.

§ *Cf.* Blue Book for 1872–73, p. 77. It is a pity that this Report, while containing a map of railways does not include roads in that map, or give a separate map to the subject.

main as the only means of communication. The road indeed will ever be the feeder of the rail. Although railways may connect Calcutta with the chief towns of India, it will be roads that will bring civilization to the country side.

Here we come again to the old question of expense. To make a good road costs about £1000 a mile.* This is not to be wondered at if the difficulty of the country in some parts is taken into consideration. In road making, not mountains, for that means rock, but plains cause the greatest difficulty, if the plain is destitute of stones, and intersected by rivers. Fortunately this kind of country partially provides the remedy by making roads unnecessary, because of the abundance of canals.† Further, sup-

* *Cf.* Col. Chesney's "Indian Polity," p. 366.

† *Cf.* Col. Chesney's words: "In Bengal, the means of making good roads at a reasonable cost do not exist. Persons whose experience is confined to Europe may find it difficult even to conceive a plain country, reaching for several hundred miles in every direction, subject to a tropical rainfall, intersected by rivers of more than usually formidable dimensions, and where there is not so much as a pebble to be found. Such is Bengal throughout the greater part of its extent. Stone, if used, must be brought from great distances; and the only possible substitute for broken stone, to lay on the road surface,

posing that the road is made, the expense of keeping it up is great. Col. Chesney says, that "it is not less than £75 a mile per annum."* This must of course be taken into account by Government, when projects for new roads are under consideration. Turnpikes are abominable things, even to the mind of an educated Englishman; much more are they to a native, who has been accustomed previously to go where he likes.† It has been proposed therefore that carts should be registered, and then be free to go anywhere; but it does not appear that this proposal has been acted upon.‡ Others urge that the making and repairing of roads should be undertaken by the local governments, who should also have power to

is the expensive and imperfect one of broken bricks; while the bridges over the large rivers of this country are too costly to be undertaken on any lines but those of the greatest importance. Fortunately Bengal has been bountifully supplied with the means of internal communication in its numerous rivers and tidal channels. But for these, the great trade of that rich country would have no existence."—*Indian Polity*, p. 370.

* "Indian Polity," p. 371.

† They do not mind paying tolls at ferries, for they then get their equivalent in the boat which conveys them across. *Cf.* Col. Chesney, *ibid.*, p. 372, note.

‡ Col. Baird Smith proposed it. *Cf.* his Report, iii., § 175.

levy rates in that way which should seem best to each individual government.

As we read the book on "Indian Railways," from which quotations have already been made on this part of the subject, one is amused to find the prejudices that existed with regard to them. People said that they were "a palpable absurdity on account of physical obstacles"; and supposing the railways are made, "the people won't travel by them, as they are all pilgrims," * and prefer to make their pilgrimages in the usual toilsome manner. The *Times* was one of the few who advocated their introduction. "It would be impossible," it says, "for even the most sanguine observer to portray all the possible results of the establishment of railway communication in the Indian peninsula. . . . There will be an end to famines, . . . there will be a check to sickness, . . . there will be new impulses and opportunities for civilization. . . . The commercial results of the enterprise would be equally extensive. . . . But these benefits, great as they are, are exceeded by the inexpressible accession to the general welfare of

* Pref. to 2nd edit., p. iv.

the poor Hindoos."* Although we cannot, alas! say that as yet all these sanguine expectations have been realized, we can say with Sir George Campbell, that "our principal success (in respect to communications) has been by introducing the great system of railways."†

But although there are about 6000 miles of railway now open in India, what is that? In England we have 11,682—nearly double. Consider the two distances with regard to the area and population of each country. It will be found that while England has one mile of railway to every 5 square miles, or about 2000 persons, India has only one mile of railway to 256 square miles, or about 35,000 persons.‡ It is yet to be seen what is the importance of railways in India. They are not indeed paying as well as they have been expected to do, for the expense is great; § but the revenue from them is increasing, and it may fairly be expected that they will in time be as prosperous as those in England. Much will of

* Quoted from a leading article of the *Times*, 27th August, 1847, in "Indian Railways," pref., p. xxxiii.

† *Vide Soc. of Arts Journal* for Jan. 29th, 1875, p. 187.

‡ *Cf.* Blair, p. 125, for a more exact calculation.

§ £16,536 a mile. *Blue Book for* 1872-73, p. 75.

course depend on whether coal, or other "minerals," similar to those by which our English railways gain their profits, is found in large quantities in India. Cotton, of course, is carried in abundance; also corn. How valuable railways may be to India in drought, is shown by the last famine; no less than 1,000,000 tons of grain were carried to the stricken districts.* "On former occasions," writes Sir Richard Temple, "the railways have proved very valuable. On this occasion, however, it is difficult to describe fully the usefulness of their services. It may suffice to say that without the railways the operations against this famine could not have been adequately carried out. The supplies of grain coming from distant places beyond sea, or from the northern extremity of India had to be conveyed by rail for distances varying from 150 to 450 miles to the borders of the distressed country."† We do not want stronger testimony than this to make us agree in the statement made at the commencement of this chapter, that "among the intervening influences between natural scarcity and

* Reports on the Famine of 1873-74. Government Resolution, § 19.

† Report on Famine of 1874, p. 47.

actual pressure . . . there is not one so important as that of communications." *

* Two notes bearing on this subject :—

A. *Communications by Sea.*—Nothing has been said above with regard to the necessity of having good harbours for India. It was the want of this in Orissa that helped to produce the famine there. The Government has been giving much attention to this subject. There are said to be no less than 656 ports and harbours altogether. A few of these may be made first-rate. Amongst the projected or nearly completed works are that of Karáchi, the port of Sind and the Punjab, and that of Cochin, where there is a backwater which is "practically a wet dock of greater area than all the docks in Great Britain put together."—*Cf. Blue Book for* 1872–73, pp. 80–83.

B. *The danger of stopping the drainage of the country by Railways.*—This is a thing that is by no means confined to India, although there the effect is more noticed. It is this that many think caused the malaria in Bardwan during the winter of 1871. (*Cf.* Mr. Shrinath Datta's letter in *Times* of March 30th, 1875, with *Blue Book for* 1872–73, p. 129.) Similarly, in Balasor an embankment which was made to keep out the sea, also keeps in the drainage, so that "when the Gammai and the Kánsbáns come down in flood it has to be pierced in order to let the water through."—(*Hunter's "Orissa," Statist. Account*, p. 36.)

ii. THE STUDY OF METEOROLOGY.

"The close connection of meteorology with agriculture is now beginning to be felt by administrators."—*Blue Book for* 1872–73, p. 32.

Supposing that there will be another scarcity over some districts of India (for with all our means of prevention we can scarcely hope to prevent that), the actual effect on the people will greatly depend on whether the approaching calamity is recognised before it comes. If not, the value of a perfect system of communications would be much impaired. It is the science of meteorology that will eventually give us the foreknowledge.

Government is now beginning to realize its importance. During the last ten years observatories have multiplied, and registers have been taken over all parts of India. These registers, however, have hardly yet been properly used: a central organization has been wanting. The meteorology of India as a whole has not been studied, although the isolation of the peninsula offers peculiar advantages for the study of the science.

Its connection with agriculture is apparent from

the facts that have been observed with regard to the weather before famines. Before 1837 there were four years of strange weather. The first and the third were very wet, the second and the fourth very dry, and in the fifth year, 1837, came the famine. Similarly before the 1860–61 famine, the weather was unusual, and again before the last famine. The year 1871 was the wettest known at Calcutta, the year 1873 the driest.*

Fortunately, it is probable that the science of meteorology will, in the next year or two, receive a great impulse, not only in India, by means of the attention directed to the subject by the Indian Government, but also throughout the world, by the publication every day of the meteorological charts in the *Times*. Now that any one, after practice for a day or two, can see the meteorological state of the greater part of Europe at a glance, observers will be multiplied, facts be collected, and calculations made.

† *Vide* Blue Book for 1872–73, pp. 32, 33.

iii. Improvements in the Administrative Machinery.

"From whatever point of view India is examined, if only it be carefully and conscientiously examined, one consequence must, I think, certainly follow. The difficulty of the experiment of governing it will be better understood, and possibly the undertaking will be regarded with more consideration."—*Sir H. S. Maine.* *

When we came to India we found the common people linked, as it were, to the ruling power by a continuous chain. The heads of the families, the heads of the villages, the heads of the districts, the heads of the provinces,—through all these gradations the power of the ruler descended on the ryot, and the ryot's complaints went up to the Government. Something similar may still be seen in France and in most of the countries on the continent. Officials extend through every class of the community. The populace have no self-government, but lean for everything on the guidance of those above them. Such was the system which our forefathers found in Bengal. They could not understand it any more than they could understand the tenure of the land.

* "Rede Lecture," p. 36.

They were free themselves, and desired that those under them should be free in the same sense of the word. They therefore removed the middle links of the chain, and told the people to govern themselves.* This was caused by Lord Cornwallis' Act, which has been interpreted to mean that the zemindars are to have such power that Government has no authority over those below them. The effect of this is that

* *Cf.* the words of Sir G. Campbell. "We Englishmen, or Britishers, as perhaps I should say, as governing India, occupy a very peculiar position. Our own institutions are free institutions, and we rely very much more on the enterprise of the people than on the machinery of government. On the other hand, we who have these free institutions govern a country which is without free institutions, without the energies which usually attend them, and which is more inclined to depend on the aid and support of government than are the people of this country. It therefore becomes extremely difficult for us, with our free ideas and free ways, to adapt ourselves to the government of the country where the people are not free, and where we are rather bound to fulfil the functions of an absolute government. Some things it is in our power to do well. We may make good laws, govern the country well, and we do many good things for the good of the people; but in some respects we are undoubtedly deficient. We have not a government machinery such as is necessary for many of the material improvements which it is incumbent on us to introduce into India, where there is vast room for improvements of that kind."—*Society of Arts Journal* for Jan. 29th, 1875, p. 181.

the Government has no means of knowing the condition of the people in Bengal. Certainly the press has recently sprung up, by which the civilized Bengali can give expression to his wants and fears, but that does not touch the country districts. It is to this ignorance on the part of the rulers that the commissioners for the Orissa famine attribute great part of the suffering.*

To remedy this, Sir G. Campbell, when Lieut.-Governor of Bengal, set himself to work. As Government had so little knowledge of the people in Bengal, there were no statistics or other data collected by which he could tell the needs of a district stricken by famine, or the place whence to supply it. He took more of the government into his own hands, and ordered that the reports of the different departments should be analysed and made into one for his perusal. He moreover gave more power to the magistrate-collectors, so that the police, gaols, and public works have been placed under their administration; and also increased the authority of the native officials.† As this is done and as the ad-

* i., § 415.

† *Cf.* Blue Book for 1872–73, p. 3.

ministrative organization of Bengal is further improved, we may hope that the actual pressure of famine may be abated.

iv. EMIGRATION.

As unfortunately Malthus' proposal to prevent too large an increase of population is feasible only in theory and not in practice (for he leaves out one important factor in his calculations, human nature) it is in many countries necessary to try some other means of reducing the number of the population. Although, as we showed above,* India, or rather Bengal, is not as yet, too densely populated, yet there is the danger of it soon becoming so. As hares would soon overrun the face of the earth if it were not for their various enemies,† so the natives of India will tend to increase if the freedom from war and an improved civilization still continues. Emigration has been the means whereby overstocked countries have been reduced from time immemorial, whether under the name of colonization or not.

* Pp. 72–76.

† *Cf.* Mill's Political Economy, I., x., § 3.

Migration, indeed, is no new thing for India. In famines the people have ever moved to better supplied districts.* But after the distress is over they return to their old homes.

Various schemes of emigration have been tried. The latest is that to Burma. This was started at the most favourable time, Dec., 1873, when the scarcity began to be felt in Bengal. But the result, after eight months, was that out of 5040 emigrants, the large majority came from Calcutta or its environs, about one-fourth from Behar, and none at all from Northern Bengal.† The fact is that the natives have an intense love for their own country, and, having little personal energy or self-reliance, they are not inclined to go out and make their own way in foreign lands.

Yet this remedy of emigration is one that will come when it is really needed. At present it is not, and the natives know that it is not. When all the cultivatable land is under cultivation, when irrigation has been spread as far as possible, when education

* *E.g.*, in famine of 1783 (Blair, p. 33); 1861 (Baird Smith, ii., § 25); 1868-70 (Blair, pp. 41, 71–75).

† Sir R. Temple's Report, p. 53.

extends to all classes, and they can realize the possibility of escaping from the chance of starvation, they will then, in accordance with the dictates of nature, seek a home in a less populated country. While providing every means of encouragement to emigrate that we may think right, we need not be discouraged if they do not use them, for at the right time they will.

CONCLUSION.

To sum up briefly that which we have said. We saw that the causes of famines in India were of two kinds: those which produced a natural scarcity of food, and those that increased the pressure of that scarcity upon the people. With a view to understanding the first, we discussed the meteorology and climate of India; showing how partial and uncertain is its water supply, especially when we considered the nature of the crops and the conditions that are necessary for their growth. Moreover, we saw that the state of agriculture was not only bad but tending to deteriorate. When we looked at the powers of resistance possessed by the people, we found them to be scanty. They had few means of communication, and their social condition was anything but good, added to which was the chance of disease, and of locusts devouring whatever was left.

Having decided that bad as these things were, they did not appear to be necessarily insuperable, we viewed in detail the means of prevention that have

been proposed. We saw that if a national scarcity is to be avoided, the tenure of the land ought to be placed on a more satisfactory footing; that under certain limitations irrigation works ought to be carried on; that all possible means to improve the agriculture ought to be taken; including in this a proposal for the greater supply of manure, the importance of statistics, of education, and of opportunities for the introduction of improved kinds of food.

We then considered the need of providing more means of communication, of a better knowledge of meteorology, of improving the administrative machinery, and finally discussed the question of emigration as a means of reducing the number of the population.

What then is the result? It is briefly this: that unless some great change occurs in the climate of India, we cannot expect to altogether prevent a natural scarcity of food sometimes taking place. We may make it less likely to happen, and of smaller extent when it does take place, but do away with it altogether we cannot. And yet the effect of this scarcity may be altogether removed. The preven-

tion of famines is possible. With the introduction of those measures which have been called "Modern Civilization," famines may become as non-existent in India as they have long been in England. Let us remember this. "For till . . . the danger of famine has been guarded against to the fullest possible extent, the English in India may replace anarchy by peace, and may distribute equal justice, and remove ignorance; but it cannot be said that they have fulfilled their whole duty by the people of the country."*

* Col. Chesney, "Indian Policy," p. 419. It may be well here to quote the opinions of some of the authorities to whom reference has often been made in this essay. Mr. Blair (p. 193), taking "famine" in the sense of natural scarcity, says: "I may state my opinion at the outset, that famines will recur in India for ever unless some vast climatological change occurs. . . . There are various possible methods of mitigating and alleviating such disasters, but to prevent them *in toto* is, I think, altogether beyond our control." The Orissa commissioners are very cautious (iii., § 27). "It is best to look the evil fully in the face, since the natural calamity which has happened in one century may happen in another; and if we cannot prevent it, we may probably, in some degree, mitigate it." Sir Bartle Frere (p. 50) says: "There are many who pretend to know something of India, who will tell you that famine is one of the normal conditions of native life in India, that the East is un-

changeable, and that the ordinary laws which we recognise as directing our conduct in this country do not apply in India. I entreat you not to believe a word of this kind of teaching. If I have learnt any one lesson during the many years I have spent in India, it is this: that there is no single law of what we call political economy, or of common sense, which applies to us here in England which is not equally applicable to India." And again (p. 16): "There are, of course, differences of degree; but there is, as far as my experience goes, no natural or inherent incapacity in Asia which could justify our despairing of being able to protect India as completely against general mortality from famine, as we and our ancestors have protected England."

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